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IMMERSION BLAST INJURIES OF THE ABDOMEN

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IN the past year there have been several reports of blast injuries to the abdomen. Atkins[1] reported 3 cases of peritonitis in Dunkirk survivors who were injured by depth charges, 2 with bowel perforation and 1 with numerous hæmorrhages in the intestinal walls. Gordon-Taylor[8] and Wakeley[12] described compression injuries of the abdomen, noting rupture of the bowel, hæmatemesis and bloody diarrhœa. Breden, d'Abreu and King[3] described 10 such cases, with 1 death from perforation of the ileum and 2 who developed late pelvic and subphrenic abscesses. McMullin *et al.*,[5] reported 35 men exposed to immersion blast injury, of which 1 had a transient psychogenic change, 4 presented pulmonary findings comparable to atmospheric blast injuries, and 14 showed evidences of severe abdominal injury. Of these latter, 6 recovered and 2 were recovering without surgical intervention, 2 were recovering after having had surgical intervention, and 4 died. Recently Auster and Willard[2] have reported another group and suggest that expectant and supportive treatment produce the most successful results. Some excellent experimental work with clinical and pathological observations has recently been done.[5, 9]

We have recently had the opportunity of observing 15 survivors of a torpedoed ship who sustained abdominal injuries from an exploding depth charge while swimming in the water. The ship received the first torpedo in the stern. This apparently damaged the firing pistol which was set to "Safety" on one of the depth charges. Another torpedo struck the vessel amidships. The ship went down stern first in about four minutes, the charge exploding as the bow disappeared, thus putting the depth of the explosion at about 150 feet. There was no column of water but only a marked agitation of the surface. The men, many wearing small kapok life-preservers, were swimming from the ship, some being still alongside, while others were 150 feet away. Almost all of them turned to watch as the ship dived and were therefore facing in that direction when the explosion occurred.

The survivors all gave a fairly uniform history of feeling that they had been struck a tremendous blow in the abdomen, 4 stating that they were paralyzed or knocked unconscious for a short period. Three vomited and one spat blood before being taken aboard the rescue craft which appeared in about three hours, but the majority reported only moderate abdominal pain and no vomiting during this period. Most of them had sufficiently recovered from the first shock to assist in rescuing themselves. Several had the urge to evacuate their bowels and one had pain in the back. Evidently fuel oil on the surface was swallowed freely.

Shortly after being rescued, severe abdominal pain and vomiting developed in all cases. One man's pain was so agonizing that he begged to be shot or thrown overboard. The vomitus contained food, oil and blood, and later became bile-stained. The degree of shock varied markedly, some of those with extensive injury being able to walk ashore twelve hours after the explosion.

On admission to hospital they all suffered severe abdominal pain, some crampy in character, but mostly a pronounced stabbing pain. All vomited repeatedly, several with blood and bile, and 9 had bloody diarrhœa. All had fever averaging about 102°. Five developed distension and almost all rigidity of the abdominal

wall at one time or another. Blood counts varied from 11,000 to 30,000 and in several cases the sedimentation rates were permanently elevated. The urine was normal in all cases.

Four patients died, 1 on the first day, 1 on the second, 1 on the fifth, and 1 six weeks later. Four had protracted periods of convalescence and still had mild symptoms five months after the injury. These are reported in detail below. Seven of the group recovered rapidly without surgical intervention and were discharged from hospital in from three to fourteen days.

CASE REPORTS

B. This man wore his life preserver but could not swim. At the moment of the explosion he was close to the ship, treading water. When taken on board the rescue ship he was having agonizing abdominal pain, vomiting blood and with blood running from his nose. He died four hours after the injury.

T.M. Though able to board the rescue ship unaided, this patient soon developed abdominal pain, requiring morphia. Continuous vomiting of coffee-ground material and oily liquid soon set in and twelve hours after the explosion, on admission to the base hospital, he was cyanosed and in shock. The abdomen was rigid and tender and in spite of supportive treatment he went rapidly downhill and died two days later. Considerable bloody fluid drained from the mouth and anus after death.

E.R. This man suffered from abdominal pain, chiefly in the right lower quadrant, and distension. He vomited repeatedly brown liquid and later bile. His temperature rose to 101° F. and pulse to 120. He improved on the second and third day but on the fourth day had a sudden severe abdominal pain, became weaker and died on the fifth day after injury. Post-mortem examination revealed two perforations in the cæcum, plastic peritonitis and multiple mucosal hæmorrhages.

J.G. This patient was admitted by stretcher to the nearest hospital twelve hours after the explosion, complaining of nausea, vomiting and abdominal pain. He had received ¼ grain of morphia twice on the rescue ship. His pulse was 110 per minute, of good quality and regular. The abdomen was "distended, very rigid and tender throughout". He was covered with oil and was vomiting oily brown liquid. He was conscious and suffering from acute pain, especially in the right upper quadrant of the abdomen extending down to the iliac crest and groin. There was absence of liver dullness. During the five weeks in hospital his temperature ranged from 102 to 103° F. with pulse between 120 and 140. The abdomen was always acutely tender, especially on the right side and varied in rigidity and fullness. He vomited almost daily bile-stained and later fæcal material, and passed old and fresh blood by stool which at times contained pus and was foul-smelling. The hæmoglobin fell at one time to 36% and the erythrocytes to 1,450,000. He was given repeated blood transfusions and parenteral fluids and was somewhat relieved by the passage of a duodenal tube. On the thirty-seventh day he was transferred by plane to Halifax, where after further intravenous therapy an abdominal laparotomy was performed. Two large abscesses containing gas and fæcal material were entered, one anterior to the ascending colon and one just beneath the liver. These were drained but two and a half days later he died after a stormy post-operative course. Staphylococci and streptococci were cultured from the abscesses.

Necropsy.—All the contents of the abdominal cavity were found to be matted together by adhesions, some firm and some easily broken down. Three perforations were found in the bowel. One in the transverse colon near the hepatic flexure measured one-half inch in diameter and connected with an abscess extending down to the cæcum. It was this abscess that had been drained. A second perforation was found in the sigmoid flexure at the brim of the pelvis which was one-half inch in length and was continuous with a large pelvic abscess. A small opening was discovered in the ileum about 14 inches from the cæcum. This was well walled off and contained only 2 or 3 c.c. of pus. The stomach, duodenum, liver, kidneys, pancreas and spleen were grossly normal. *B. coli* only were cultured from the pus.

K.A. When the explosion took place this patient was swimming quickly facing the ship and holding on to his life preserver which he had not had time to put on. He was, he thought, forty feet away and facing the explosion. The sensation was like a punch in the stomach but there was no shock in the chest or testicles. He swam about for three hours before being picked up. Soon afterwards he vomited his breakfast, some oil and a few streaks of blood. Vomiting continued at intervals for several hours. Except at the time of the concussion he experienced no pain while in the water. After being picked up he developed abdominal pain severe enough to double him up and make him cry out. This was at first generalized, but after one week became more localized in the mid-abdomen on the right and left of the umbilicus. Morphia was necessary repeatedly during the first five days.

For five weeks after the accident he remained acutely ill, with intermittent abdominal pain and nausea, fever to 101° F., leucocytosis up to 13,000 white blood cells, and anæmia to 73° hæmoglobin. He was weak and prostrated, having lost 35 lbs. The abdomen varied from day to day, always tender but sometimes soft, at other times rigid. No masses were palpable. The liver dullness was not reduced and nothing abnormal was ever felt by rectum. A course of sulfathiazole started at this time seems to have brought the temperature to normal and from then on convalescence though slow was progressive. It was, however, twelve weeks from the accident before all evidence of injury had cleared up and he was discharged from hospital. After three weeks on leave he began to have vague abdominal pain unassociated with fever, leucocytosis, or an increased sedimentation rate. The abdomen was moderately tender and somewhat resistant. A barium series and barium enema at this time were normal and after two weeks in hospital he has again been discharged.

J.T. He estimates that he was seventy-five feet from the explosion and was treading water, facing the ship. His life-belt was on backwards. At the moment he felt as if someone had kicked him in the stomach. He coughed or vomited bright blood at once but thereafter the vomitus was green. He swam about for three hours, was then put on a rescue ship and walked ashore twelve hours after the explosion. Two hours later in hospital the abdominal pain began and continued at intervals for several weeks. For the first week it was generalized but thereafter became more localized. He was critically ill for four weeks with fever, leucocytosis 13,150, a mild anæmia and a rapid sedimentation rate. In this time he lost 35 lbs. He showed no response to sulfathiazole. The abdomen showed indefinite, varying amounts of tenderness on deep palpation, more marked on the right than the left side. Rectal examination was negative. His recovery was very slow but uneventful, and it was twelve weeks before all evidence of infection had subsided.

N.W. This rating was not injured on leaving the ship and was about fifty feet away treading water and facing the explosion. His life-belt had been put on backwards and was not tied. At the concussion, he felt a pain in his abdomen and back and immediately

found his arms and legs numb and paralyzed. He floated helplessly, "like a dead fish", and was soon pulled abroad a raft. Vomiting of bright blood began at once and continued for about five hours. Except for the first shock he had little abdominal pain for the first twelve hours but passed several loose bloody stools. Sensation and motion returned to the arms in four hours and to the legs in twelve hours. The next day the pain became severe, was generalized, and did not radiate. The abdomen was tense and distended. Liver dullness was absent but gradually returned in the course of three weeks. On admission to hospital no neurological signs or symptoms were evident.

For four weeks his temperature was high and fluctuated up to 104.8°. The white blood count was as high as 29,900. He was weak, at times dyspnœic and cyanosed. Persistent dullness could be elicited at the right base posteriorly with distant breath sounds and variable râles. When x-ray facilities became available four weeks after the accident, chest films showed linear shadows in the left lung and an area of increased density with fairly smooth upper margins at the right base. Six weeks later this was still present, consisting of a linear shadow high in front and low behind, cutting across the bronchovascular markings associated with slight lag of the right diaphragm.

After being seriously ill for one month he began showing rapid improvement with no treatment other than transfusions, bed rest and limited food intake. He regained the 30 lbs. lost; the dyspnœa, cyanosis and general malaise cleared up and his temperature assumed normal levels. In spite of this the leucocytosis and increased sedimentation rate remained elevated for twelve weeks.

Five months after the accident he was readmitted for investigation of a dull aching pain in the right lower quadrant radiating to the right thigh and a similar pain below the umbilicus associated with a full bladder. Thorough investigation of the gastro-intestinal tract and genito-urinary tract failed to demonstrate any lesion and no evidence of residual infection could be found.

J.M. This rating was thrown about seven feet by the original explosion. He fell on his back. Later, while treading water about 200 yards from the ship as she sank, he felt a sensation of being "kicked in the stomach". He lost consciousness for a few minutes but was picked up by the rescue ship two hours later. About this time vomiting of blood, bile and fuel oil began and continued at intervals for twenty-four hours. The abdomen was rigid and tender for several days but it was not thought that he had any peritonitis. He complained of persistent hiccoughs through the acute stages of his illness. The leucocytosis never rose above 11,500 or his temperature above 100, and he was discharged from hospital for leave on the twenty-second day.

Three months after the accident he still had nausea in the afternoon with pain in the left upper quadrant. These symptoms were aggravated by hard work and hiccoughing but relieved by passing gas by rectum. Barium studies at that time showed a collection of gas-filled loops of small bowel in the left upper and left mid-abdomen which were considered to be distinctly abnormal. There was definite tenderness, but no rigidity, in the region of the splenic flexure. Blood studies were found to be normal.

DISCUSSION

Reviewing this material brings out several interesting features. One is the tremendous force of the blast. One of the officers had a cigarette lighter in his trouser pocket which was completely flattened, as was his wrist watch. He was swimming on his back watching the sinking ship, beside his captain who was swimming on his abdomen, when the blast occurred. The captain was killed. The officer survived, with the usual symptoms of vomiting, bloody diarrhœa, and pain, but was able to leave hospital in two weeks. This would seem to argue against the suggestion that the blast enters the rectum tearing the bowel. Testicular pain reported by other observers was absent in all but one case.

Another interesting point was the almost complete absence of chest symptoms. Almost all of these men had kapok life-preservers about their chests, which probably added some protection as well as elevating them to the water's surface. The bony thorax naturally adds another barrier. The contrary appears to be true in surface blast. It is suggested that added protection to the abdomen might reduce the injurious effect of the explosion, a conclusion supported by experimental evidence.[13] One patient (R.W.) showed clinical and roentgenological evidence of a pulmonary lesion resembling those reported in air blast injury by several observers and in water blast injury by Gates.[5]

We have been particularly interested in four patients (K.A., J.T., R.W., J.M.) who required a longer period of convalescence than the others and some of whom even now, six months after the injury, are not entirely free of symptoms. In three of these the white blood count and sedimentation rate did not fall to normal levels for three months. During this period there was a changing abdominal picture varying in tenderness and rigidity from day to day. They ran a low-grade fever for many weeks which in two cases subsided promptly under sulfathiazole therapy. Two were later readmitted to hospital because of abdominal pain and vague tenderness, though at this time all other findings including barium studies of the entire gastro-intestinal tract were normal. One patient (R.W.) complained of lower abdominal pain when his bladder became about half distended, but cystoscopic investigation showed no demonstrable lesion and the urine was normal throughout his illness. A striking feature of these cases was the loss in weight of 30 to 35 lbs. which was rapidly made up only after all evidence of infection had subsided in spite of good appetites and full diets.

In view of the leucocytosis, prolonged sedimentation rate, fever and loss of weight asso-

ciated with moderate or severe abdominal pain, tenderness and rigidity, and in the absence of physical signs of abscess formation, we are of the opinion that a low-grade inflammatory process was operative in the bowel wall or peritoneal cavity. It would seem reasonable to assume that injury from submucosal hæmorrhages permitted the infiltration of invading pathogenic organisms into or through the wall of the bowel. The apparent response of two of the cases to sulfathiazole would support this assumption.

Submucosal and petechial hæmorrhages in the bowel wall could interfere with the neuromuscular mechanism, producing ileus and even, if gross, late sloughing and perforation. Retroperitoneal hæmorrhage, trauma to intercostal nerve and abdominal muscles could similarly complicate the picture. One is struck in studying these data by the fact that a number of factors influence the extent and type of injury that result from the blast of this kind. A man in the prone position or facing the explosion would appear to be at a disadvantage over one swimming on his back or turned away. This was observed also by Palma and Uldall.[5] The distance from the ship had a very direct influence on the amount of injury. Experimental studies[9] show that the amount of gas in the intestine at the time is important, a portion of the bowel containing only fluid apparently being relatively immune to trauma. All of our patients had had breakfast an hour before, but we were unable to secure definite information as to bowel evacuations.

The most reasonable explanation of the mechanism by which the pathological lesion is produced would seem to be that advanced by Greaves *et al.*[9] in their excellent paper, and our experience would tend to cast further doubt on an earlier theory of direct violence through the anal sphincter.

In this series the mortality among those brought ashore alive was 21.4%. In the light of what we have since been able to learn of the problem it is possible that this figure could have been lowered by early surgical procedures in some of the patients.

RECOMMENDATIONS

From the course of these and other reported cases we would like to bring forward certain recommendations:

1. That naval personnel be warned of this danger in the event of disaster at sea. They could be advised to swim as quickly as possible away from the sinking ship, to keep turned away from it, and when opportunity presents to pull themselves as far out of the water as possible.

2. That life-preservers be made of kapok and designed to cover the abdomen and chest as suggested by Commander Knight.[13]

3. That treatment of shock and blood loss be instituted early and include transfusion of blood and plasma.

4. That physicians in coastal areas appreciate the urgency of early treatment both medical and surgical and be encouraged to report cases at once.

5. That naval base hospitals be prepared either to fly surgical and transfusion equipment to the scene of action or to transport patients promptly to a point where such treatment is available.

6. That early chemotherapy be seriously considered.

Although we have nothing to add to experienced surgical judgment, within twelve hours it should be decided which cases require operative interference, and we are of the opinion that any doubtful cases should have the benefit of a laparotomy.

REFERENCES

1. ATKINS, J. H. B.: Lessons from Dover, *Guy's Hosp. Gaz.*, 1940, **54**: 192.
2. AUSTER, L. S. AND WILLARD, J. H.: Hydraulic abdominal concussion, *J. Am. M. Ass.*, 1943, **121**: 995.
3. BREDEN, N. P., D'ABREU, A. L. AND KING, D. P.: Sudden compression injuries of the abdomen at sea, *Brit. M. J.*, 1942, **1**: 144.
4. CAMERON, G. R., SHORT, R. H. D. AND WAKELEY, C. P. G.: Pathological changes produced in animals by depth charges, *Brit. J. Surg.*, 1942, **30**: 49.
5. Symposium on immersion blast injuries, *U.S. Naval Med. Bull.*, 1943, **41**.
   McMULLIN, J. J. A. *et al.*: *Ibid.*
6. FRIEDELL, M. T. AND ECKLUND, A. M.: Experimental immersion blast injury, *U.S. Naval Med. Bull.*, 1943, **41**: 343.
7. FRIEDELL, M. T. AND BURKE, R.: *Ibid.*
8. GORDON-TAYLOR, G.: Surgery of Modern Warfare, Ed. by H. Bailey, Livingstone, Edinburgh, p. 224.
9. GREAVES, F. C. *et al.*: An experimental study of underwater concussion, *U.S. Naval Med. Bull.*, 1943, **41**: 339.
10. KING, J. D. AND CURTIS, G. M.: Lung injury due to detonation of high explosive, *Surg., Gyn. & Obst.*, 1943, **74**: 53.
11. O'REILLY, J. N. AND CURTIS, G. M.: Blast injury of lungs, *The Lancet*, 1941, **2**: 423.
12. WAKELEY, C. P. G.: Differential diagnosis of lung injuries, Discussion, *The Lancet*, 1941, **2**: 199.
13. WILLIAMS, E. R. P.: Blast effects in warfare, *Brit. J. Surg.*, 1942, **30**: 40.
14. ZUCKERMAN, S.: Experimental study of blast injuries of the lungs, *The Lancet*, 1940, **2**: 219.

THE EFFECT OF RIBOFLAVIN ON CORNEAL VASCULARIZATION AND SYMPTOMS OF EYE FATIGUE IN R.C.A.F. PERSONNEL*

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ORIGINAL work by Bessey and Wolbach[1] in 1939 demonstrated that rats fed on a diet deficient in riboflavin developed evidence of vascularization of the cornea. This study was repeated at the Hospital for Sick Children, Toronto during the early months of 1942, and the results obtained by the original investigators reproduced.

Using a variation of Bessey and Wolbach's technique, an attempt was made in this study to demonstrate photographically the changes which occur in the cornea of the riboflavin deficient rat. When the animal was ready for sacrifice, it was anæsthetized, the thorax opened and one millilitre of india ink was injected into the left heart. The anæsthesia was deepened and the beats of the heart which occurred before the animal succumbed disseminated the india ink throughout the blood vessels of the body including any new vessels which had formed in the cornea. The animal was immediately hung in a head-down position and as soon as possible photographs were taken of the eye, using a 12-inch extension tube on a reflex camera.

Application of Bessey and Wolbach's work to the human subject was first suggested by Kruse, *et al.*[2] in 1940. These writers suggested that the minor degrees of vascularization frequently seen in apparently normal human beings were due to a deficiency of riboflavin in the daily diet. They postulated further that symptoms of tiredness of eyes, burning of the eyes, a sandy sensation under the lids and lacrimation could be manifestations of the deficiency and, under these circumstances could be cleared by the administration of riboflavin in adequate dosage.

Under ordinary office conditions optimal requirements of riboflavin are 2.5 to 3.0 mgm. daily. However this substance is rapidly destroyed by light and it seems possible that an individual who is exposed to a great deal of light would have an increased destruction of riboflavin in the eye which would necessitate a greater intake to maintain normal vision and normal health. Men in aircrew in the R.C.A.F. are exposed to much more light than is usually encountered in civilian life. Furthermore, assays of the R.C.A.F. rations as served prior to June 1, 1942, averaged only 1.6 mgm. of riboflavin daily, as against 2.5 to 3 mgm. required under civilian conditions. Because of these facts it was felt that a study of the prevalence of corneal vascularization and the symptoms which could be due to a lack of riboflavin in aircrew should be made. In a study of this nature the development of a photographic technique was necessary to ensure accurate and permanent records of the vascularization.

R.C.A.F. METHOD OF OPHTHALMIC PHOTOGRAPHY

The apparatus used in obtaining photographs of quadrants of the eyes has been specially designed and constructed for this purpose. Previous to these experiments there was no known apparatus which would achieve the desired results. The following is a brief comment on the equipment.

The assembly consists of three components, the camera, the light-source, and the face-piece.

(*a*) *The camera.*—The camera is a reflex, using a magnifying view finder for critical focus. Focussing is accomplished by moving the entire camera with a vernier adjustment. The bellows extension is locked in place and is the governing factor in magnification permitting quadrant sections or the entire eye to be recorded. A 2″ Eastman Projection Ektar lens, fully colour-corrected, is used. Focussing is carried out with the lens opened to its maximum aperture. When critical focus has been obtained, the entire sequence of action is carried out by pressure on a lever. The lens diaphram is closed, the reflex mirror raised, and the electric circuit closed (discharging the light source), the capping cover is closed, and the exposure number is registered. Pressing another lever resets the camera for the next exposure. The camera is equipped with automatic film transport for successive exposures and a veeder counter which

* Reported to the Associate Committee on Aviation Medical Research, National Research Council, September 17, 1942.

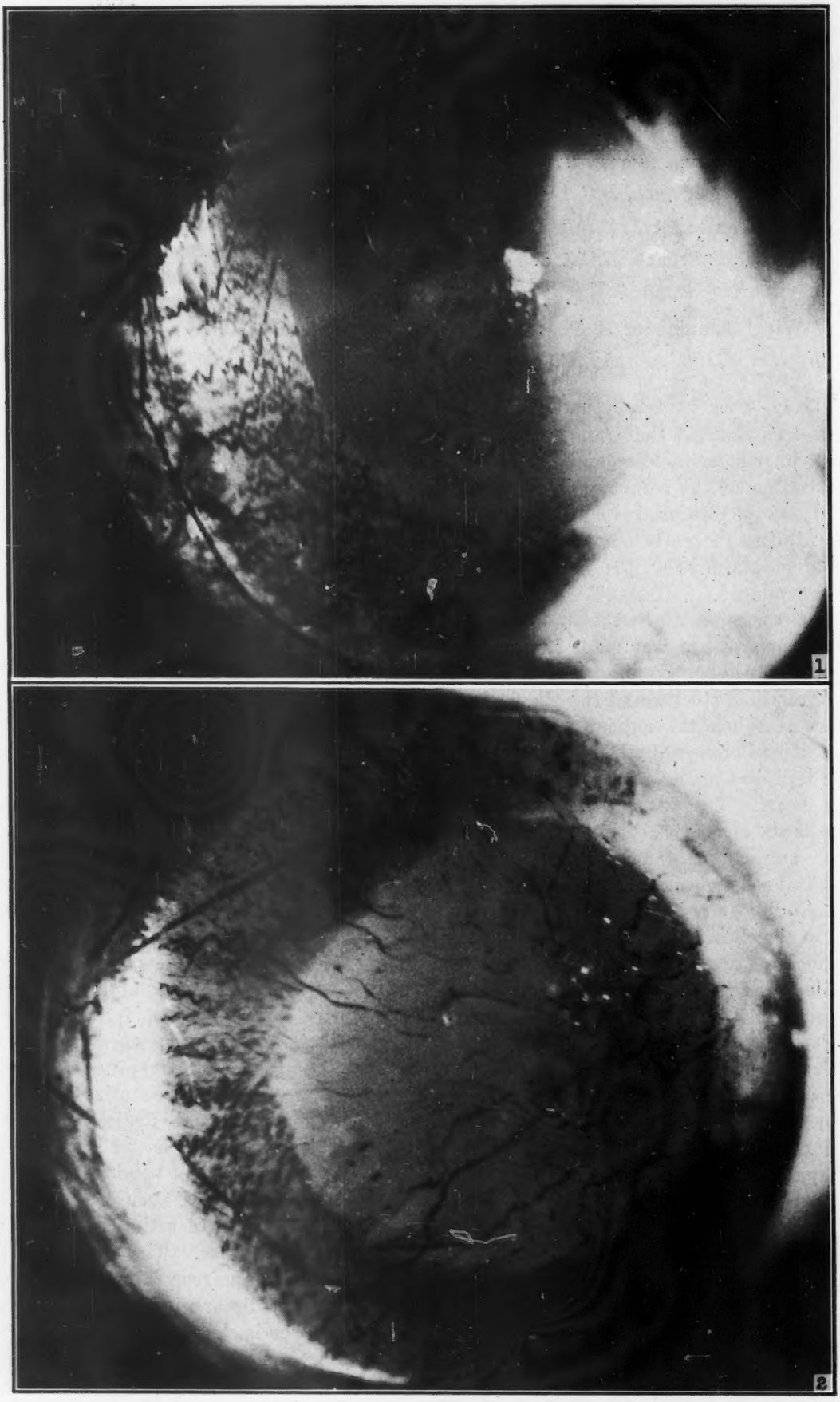

Fig. 1.—Eye of normal rat. The vessels outlined are those normally found in the iris.
Fig. 2.—Eye of riboflavin-deficient rat. The rat has existed on the riboflavin-deficient diet for 103 days. The extension of the vascularity into the cornea is apparent.

registers the exposure number on each film for purposes of record.

All photographs are made on 120 size roll, using 2¼ x 2¼ exposures, which was found to be the most practical size.

(*b*) *The light source.*—Early experimentation resulted in the discarding of any common "constant source" of light (photoflood) or explosive source (photoflash). These light sources cause considerable discomfort to the subject. The Xenon-Krypton gas arc (kodatron) was found to be a satisfactory source of illumination. While this light source has an extreme intensity equivalent to two million watts, the flash duration is only 1/30,000 of a second. The patient is aware of a slight flash, but suffers from no discomfort. The colour balance of this light makes it suitable for orthochromatic, panchromatic and colour work. A mild pilot light permits focussing with a minimum of discomfort.

The light source is mounted upon a ring, permitting it to be focussed upon the eye in a critical position. Once the light has been so adjusted, it remains in the same relative position for each quadrantal exposure. Adequate and even illumination is thus assured. A pair of 3" condensors project the light over the area of the eye. The modelling light shining through a small green spot on the condensor acts as an eye-position guide light. If the patient "looks" at the green spot as the light is positioned, the correct quadrant of the eye will be exposed. The power pack which charges the kodatron operates on 110 volt 60 cycle current.

(*c*) *The face piece.*—This has been designed to provide a maximum of comfort. The patient rests his chin in the chin rest and the face is supported by a padded frame. It is adjustable for height. The patient, therefore, has no tendency to move about and move the eye out of the critical position necessary for photography.

CORNEAL VASCULARIZATION

Early examination of R.C.A.F. personnel revealed that various stages of vascularization of the cornea occurred. At the conjunctivo-corneal margin there exists usually a narrow transitional area completely opaque on its conjunctival side and transparent on the corneal side with a gradual gradation between. Whether or not vascularization in this area is abnormal is a subject of considerable discussion.

Sydenstricker[3] holds that vessels normally exist in this area. Kruse,[4] on the other hand, feels that there should be no blood vessels in this area, under normal circumstances. Both authorities agree that when blood vessels in this region are congested they represent an abnormal finding. Based on this assumption the following strictly arbitrary classification of degree of corneal vascularity was set up to cover the various types encountered. *Normal eye.*—An eye showing no proliferation of the vessels of the limbic plexus

Fig. 3.—The R.C.A.F. ophthalmic camera.

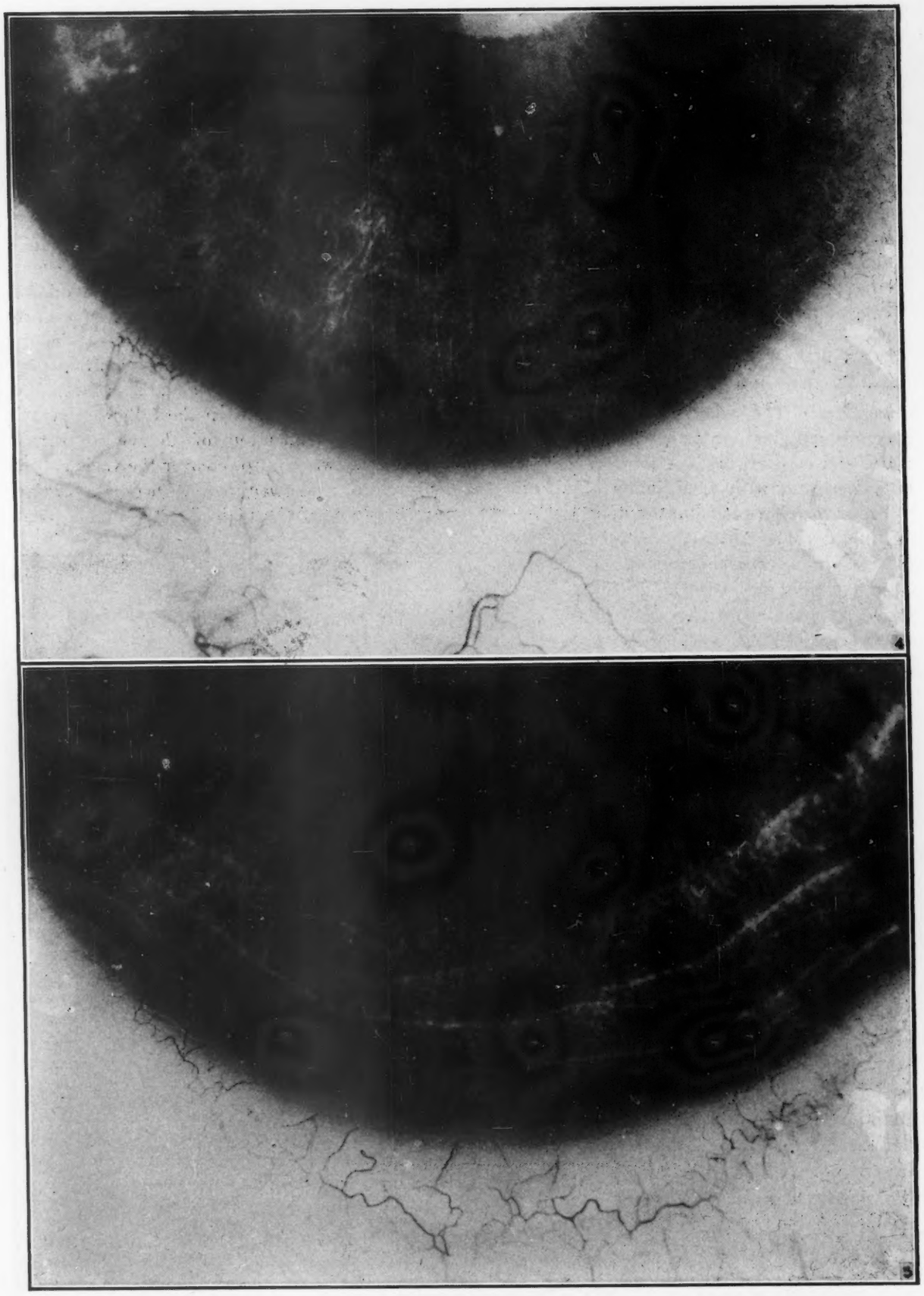

Fig. 4.—Normal eye. An eye showing no proliferation of the vessels of the limbic plexus and no penetration of the cornea with blood vessels.

Fig. 5.—Stage 1. An eye showing proliferation of the vessels of the limbic plexus and no penetration of the cornea or penetration only with tiny twigs in one or two sharply localized areas.

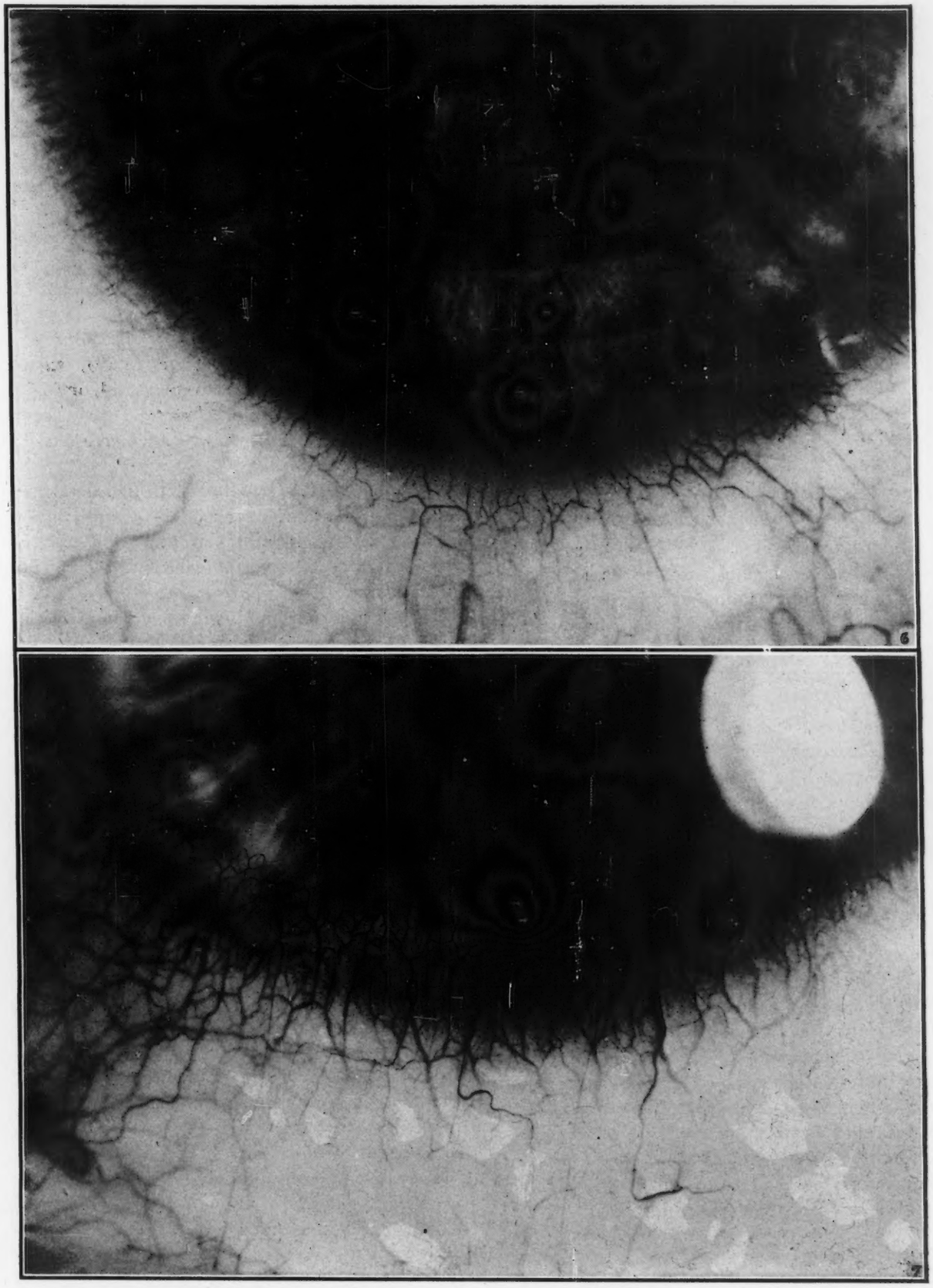

Fig. 6.—Stage 2. An eye showing proliferation of the vessels of the limbic plexus and penetration of the cornea with twigs and streamers.

Fig. 7.—Stage 3. An eye showing proliferation of the vessels of the limbic plexus and penetration of the cornea with twigs, streamers and loops.

and no penetration of the cornea with blood vessels. *Stage 1.*—An eye showing proliferation of the vessels of the limbic plexus and no penetration of the cornea or penetration only with tiny twigs in one or two sharply localized areas. *Stage 2.*—An eye showing proliferation of the vessels of the limbic plexus and penetration of the cornea with twigs and streamers. *Stage 3.*—An eye showing proliferation of the vessels of the limbic plexus and penetration of the cornea with twigs, streamers and loops.

A study was instituted in May, 1942, to determine the prevalence of these various degrees of vascularization of the cornea in men who were flying over water and exposed to considerable glare much of the time. One hundred and ninety-eight men were examined and the incidence of the various degrees was as follows:

Normal eye	1,	or 0.5%
Stage 1	17,	or 8.6%
Stage 2	87,	or 43.9%
Stage 3	93,	or 46.9%

A group of men showing stage 3 involvement was chosen to demonstrate the effect of treatment on vascularization of the cornea and the symptoms of eye fatigue. These men were carefully questioned regarding the eye symptoms which Kruse and others suggested could occur due to a deficiency of riboflavin. Specific inquiry was made concerning the following: Tiredness of eyes; aching of eyes; watering of eyes; sandy sensation under lids, dizziness; headaches; reading intolerance; decreased visual acuity.

Of the men studied, 67% suffered two or more of the above symptoms and, in almost every case the symptoms were worse after, or occurred only after, flights in bright weather.

The men were divided into 3 groups. One received capsules containing 3.3 mgm. riboflavin three times daily for a period of two months. The second group received similar capsules three times daily for one month, the third group received capsules which were similar in appearance but which contained no riboflavin. None of the men were aware that two different types of treatment were used.

Pictures were taken of the cornea and symptoms where checked before and at intervals of two weeks throughout the study.

RESULTS

Changes in vascularity.—Degrees of improvement of vascularity were judged as being: *Marked*—if a very obvious change occurred in the extent of the vascularization which was discernible with a glance at the photographs. *Moderate*—if improvement was present but required some study of the photograph and comparison, vessel with vessel, for its demonstration. *Slight* or *doubtful, unchanged* and *worse* completed the classification.

Of the 28 men who received treatment with 9.9 mgm. of riboflavin daily for a period of 2 months, 20 showed either marked or moderate improvement—a total of 71.4%. Eight of the men showed either slight or doubtful improvement or no change during this period. None of the men showed increase in vascularization of the cornea.

Of the 21 men who received treatment for a period of one month, 6, or 28.6%, showed marked or moderate improvement; 14, or 66.6%, showed slight or doubtful improvement or no change, and one man showed an increase in the vascularity.

Of the 21 men treated with placebos none showed either marked or moderate improvement, 15, or 71.4%, showed slight or doubtful improvement or were unchanged and 6, or 28.6%, were worse.

The time element in these changes is one which has given rise to considerable controversy. Kruse,[5] in line with his theory of chronicity in nutritional disturbances believes that the time required for response to riboflavin depends upon the duration of the deficiency state. He postulates that acute deficiency states, *e.g.*, those which have been operating for short periods of time, will respond rapidly to therapeutic dosage of the deficient nutritional element, while prolonged deficiency states will respond to large doses of the required nutritional material only if they are carried on for many months or even years.

Sydenstricker,[6] and many other workers, on the contrary, believe that deficiency states should respond within a few weeks to therapeutic doses of the deficient substance. A report[7] has appeared recently in which the author has stated that 1 to 4 weeks of therapeutic trial only is required to determine the efficacy of riboflavin in the treatment of corneal vascularization.

Repeated photographs of the eyes of the subjects in this study at intervals of 2 weeks provided some opportunity to observe the time required for the changes to occur *in these particular subjects.* In one case only did marked change occur within a period of a few days. In the remainder, as the results of those treated for one month and two months would indicate, the vascularity cleared progressively and

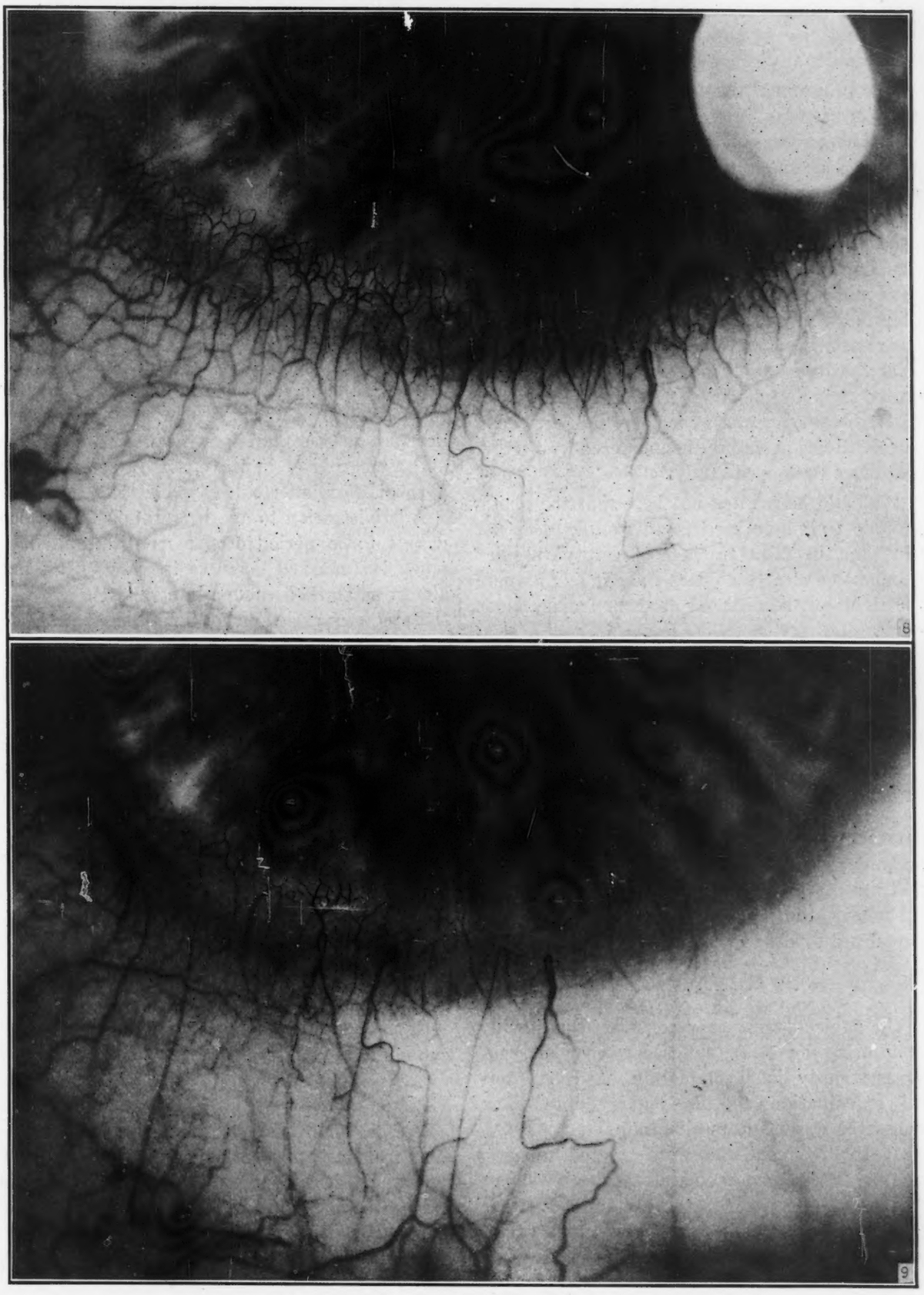

Fig. 8.—Before treatment. Fig. 9.—After treatment.

steadily over the 2 months' period of observation. Had this study been terminated in 2 weeks relatively few of the personnel treated would have shown any gross change in vascularity.

The progress of the decrease in vascularity of the cornea was interesting to observe. The initial change was a shrinking-down of the blood vessels, a decrease in congestion. As time went on the circulation of the blood became impeded and finally stopped as the walls of the vessels apparently contracted on the circulating cells. Finally, the cells were trapped and at this stage the blood vessels could be traced as dotted lines, each dot representing a trapped red blood cell. Only after some weeks of treatment were these cells absorbed and the vessels then were represented only by shadowy tracing. Whether or not these blood vessels, once emptied, ever completely absorb, can only be answered by further and more prolonged study.

It should be pointed out here that the photographic technique used in this study does not show up the faint tracings of empty vascular channels as clearly as does the slit lamp where the light can be directed at them from various angles.

Using the photographic technique, surveys were made of large numbers of civilian office workers and R.C.A.F. personnel on entry to the R.C.A.F. and at various stages of their training. The prevalence of corneal vascularization was quite high in all groups. With R.C.A.F. personnel in areas where milk, the best source of riboflavin in the diet, was not available, the prevalence and severity of corneal vascularization was markedly increased.

Further studies using larger numbers of personnel are in progress.

SYMPTOMS

The subjects were only considered as having symptoms when they suffered two or more of the previously listed complaints. At each interval examination specific inquiry into these symptoms was made in all groups.

Of the 28 men who were treated for two months, 21 had symptoms at the beginning of the study. Twenty of these men had either complete clearing or improvement in their symptoms at the end of the treatment period. One man had noted no change.

Of the 21 men treated for 1 month, 16 suffered from symptoms when treatment was instituted. Fourteen of these men claimed either complete clearing or marked improvement; two noted no change.

Of the 21 men treated with placebos, 10 suffered from symptoms at the beginning of the period. One man felt that his symptoms had improved during the study, the remaining 9 were unchanged.

SUMMARY

In a relatively small group of apparently healthy individuals exposed to considerable glare in their daily routine, the prevalence of vascularization of the cornea, and of symptoms which have been accredited to riboflavin lack was surprisingly high.

The administration of large amounts of riboflavin (9.9 mgm. daily) for a period of 2 months to one group of the men caused a progressive decrease in vascularity in approximately 70% and a clearing or improvement in symptoms in 95% of those affected.

Administration to another group of the same dosage for a period of one month resulted in much less marked decrease in vascularity, but almost as marked change in symptoms as when therapy was carried on for 2 months.

Administration to a third group of capsules similar in appearance but containing no riboflavin resulted in no appreciable change in vascularity and improvement in symptoms in only 10% of the subjects involved.

Surveys, using the photographic technique, were made of large numbers of civilian office workers and R.C.A.F. personnel on entry to the R.C.A.F. and at various stages of their training. The prevalence of corneal vascularization was quite high in all groups. With R.C.A.F. personnel in areas where milk, the best source of riboflavin in the diet, was not available, the prevalence and severity of corneal vascularization was markedly increased.

Further studies using large numbers of personnel are in progress.

CONCLUSIONS

1. The incidence of vascularization of the cornea among apparently healthy young adults in Canada is surprisingly high and seems to vary with the riboflavin-containing foods in the diet.

2. Riboflavin in large dosage for a period of 2 months decreased vascularization of the cornea in a large percentage of cases and caused marked improvement in symptoms of eye fatigue in men exposed to glare in their flying duties.

REFERENCES

1. BESSEY, O. A. AND WOLBACH, S. B.: Vascularization of cornea of rat in riboflavin deficiency with note on corneal vascularization in vitamin "A" deficiency, *J. Exper. Med.*, 1939, **60**: 1.
2. KRUSE, H. D., SYDENSTRICKER, V. P., SEBRELL, W. H. AND CLECKLEY, H. M.: Ocular manifestations of ariboflavinosis, *Pub. Health Rep.*, 1940, **55**: 157.
3. SYDENSTRICKER, V. P.: Personal communication.
4. KRUSE, H. D.: Personal communication.
5. *Idem*: A concept of the deficiency states, *Milbank Memorial Fund Quarterly*, 1942, **20**: 245.
6. SYDENSTRICKER, V. P.: Personal communication.
7. SCARBOROUGH, H.: Circumcorneal injection as a sign of riboflavin deficiency in man, *Brit. M. J.*, 1942, **2**: 601.

RÉSUMÉ

Chez les individus exposés quotidiennement à la lumière intense, notamment chez les aviateurs, la vascularisation cornéenne est d'observation très fréquente; il en est de même des signes attribués à la carence de vitamine B_2: larmoiement, fatigue oculaire, fatigabilité à la lecture, céphalée et vertiges. La riboflavine (B_2) donnée à forte dose (9.9 mgm p.j.) pendant 2 mois a amené chez un groupe de sujets une diminution progressive de la vascularisation dans environ 70% des cas, et la disparition des autres signes de la carence dans 95%. Chez un second groupe, la même dose donnée pendant un mois a diminué la vascularisation à un degré moindre mais a enrayé les symptômes concomitants de façon au si efficace qu'avec le traitement de 2 mois. La recherche photographique de cette vascularisation cornéenne auprès du personnel civil et militaire de la R.C.A.F. a démontré que celle-ci était très fréquente. Les régions où la R.C.A.F. est bien pourvue en lait sont celles où l'avitaminose B_2 est la plus légère. JEAN SAUCIER

PAGET'S DISEASE OF BONE

(With Report of a Case)

By James Miller, M.B., Ch.B., M.D., F.R.C.P.(Edin.), F.R.C.P.(C)

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THERE is a curious and interesting paradox about osteitis deformans (Paget's disease), for it is both rare and comparatively common. In his first paper, read before the Royal Medico-Chirurgical Society of London, Paget[6] says "I have looked for records of cases similar to these in nearly every work that seemed likely to contain them, but in vain. I have found only three cases and the first two of these are doubtful." During the ten years that I was a member of the Deutsche Pathologische Gesellschaft (1904-14) only two cases were presented to the society, and the German pathologist being what he is, or was, one can be fairly certain that few if any fully worked out cases with autopsy findings were missed during that period. On the other hand, G. Schmorl,[7] of Dresden, gives details of 138 cases which came to autopsy during a period of thirty years and were observed by himself.

The fact is that there appear to be two forms of the disease, one common and involving one bone of the skeleton (monostotic), the other rare, involving several bones or the greater part of the skeleton (polyostotic). If the monostotic or subclinical variety be included it is estimated (Jaffe[3]) that the disease occurs in 3% of persons over the age of forty years. Whether these are actually two forms of the same disease or different and related conditions is uncertain. A point in favour of their being different in origin is the fact that the monostotic variety is most common in the tibia while the polyostotic favours the sacrum and the vertebræ, although it also may implicate the femur and the other bones of the extremities.

Without knowledge of the cause and with some uncertainty as to the pathology of the condition, it is probable that several anomalies are included under the heading, Paget's disease of bone. The original term suggested by Paget, osteitis deformans, is almost certainly wrong, for the pathological changes do not suggest inflammation of bone. The name leontiasis ossea, introduced by Virchow, is merely descriptive of the gross appearances of the patient suffering from the very rare type affecting the bones of the face. Recently the term osteodystrophia deformans (δυς, difficult, and τροφε, nourishment) has been suggested. It is non-committal but clumsy. In view of our uncertainty as to causation, however, the term "Paget's disease" is probably the best. It should be emphasized that it is necessary to add "of bone" because Paget's disease of the nipple is a totally different condition and the etiology has been worked out by Robert Muir as being essentially malignant and associated with the presence of an underlying duct carcinoma.

Regarding related bone disease, that which most closely resembles Paget's disease is osteitis fibrosa cystica (Recklinghausen's disease). Indeed, G. Schmorl at the Freiburg meeting of the Deutsche Pathologische Gesellschaft in 1926 fell into the error of regarding the two as manifestations of one and the same disease. At the time he was either unaware of or had ignored the work of Askanazy, Mandle and others which linked Recklinghausen's disease definitely with hyperpituitarism. In consequence Schmorl had to appear at the 1930 meeting of the Society more or less in sackcloth and ashes and withdraw his previous statement. Rickets and osteomalacia, which were originally regarded as factors in the differential diagnosis, have, of course, been placed among the deficiency diseases, due to lack of vitamin D. With the etiology in obscurity and the pathogenesis vague, the factors which have some bearing upon the condition assume importance.

As regards *age*, the disease is one of later middle life. Most cases begin to show signs over the age of forty years, although instances have been described in children and adolescents (Kerr[4]).

Sex seems to play some part. Paget believed the condition to be more common in males, and statistics including large numbers of cases bear this out. Kerr, analyzing 439 cases in which sex is reported, finds 60% in males and 40% in females. Schmorl, in his 138 cases, found the distribution between the sexes to be 57.9% males, 42.1% females.

As regards *race* and *climate*, Kerr mentions that in America nearly all the cases were reported from the more northern states. Of the 208 cases in the United States in which race is mentioned 101 were Caucasians, 9 Negroes, and one occurred in an individual of mixed Indian, French and Anglo-Saxon origin. Cases have been reported from most of the European countries, and the condition does not appear to be more common in one than in others. It is probable that race is not a factor of any importance. In this relation it is interesting that instances of a disease similar in gross and microscopic appearances have been reported in apes (Max Koch[5]) as well as in horses, goats, swine and several of the smaller domestic animals (Aschoff[1]).

Heredity.—Paget stated that no hereditary tendency was to be found in his series of cases. Kerr says that in 22 of his American cases there was an hereditary element, more than one member of the family being affected. De Costa mentions four instances in which other members of the same family were affected. In the case now presented the disease appeared to show a family distribution.

Insanity.—Paget makes the point that the disease is not associated with mental trouble, a matter of some importance in the differential diagnosis. The case cited below was under treatment in a mental hospital, but her condition was probably due more to arteriosclerosis than anything else.

Endocrines.—There is no known connection between pathological changes in any of the endocrines and Paget's disease of bone. Some degree of hypertrophy of the parathyroids has been described in some cases and in one an adenoma of the parathyroid was found, but this was probably an instance of mistaken diagnosis (Kerr).

PATHOLOGICAL FINDINGS

According to Paget the disease affects most frequently the long bones of the lower extremity and the skull, and the changes are usually symmetrical. As already stated, a distinction has to be made between the monostotic type in which the tibia is the bone most frequently affected (Bell[2]) and the polyostotic with involvement of many bones. Schmorl, in his series of 138 cases, found the frequency to be: sacrum, vertebræ, right femur, skull, sternum, pelvis, left femur, clavicle, tibia, ribs, humerus, in that order. The hands and feet are least commonly affected and the bones of the face, very rarely (leontiasis ossea). The bones increase in length and thickness. They are heavier than normal, but this is due to there being more bone, not to increase in weight of bone. The bone is more vascular, more porous and softer, so that not infrequently it can be cut with a knife. The distinction between compact and spongy bone is lost (Fig. 1). Necrotic and eventually cystic areas appear. The consequent weakening of the bone results frequently in spontaneous fracture.

Microscopically the earliest change to be observed is, according to Schmorl, the appearance of osteoclasts or multinucleated bone cells, which hollow out and remove the normal bone. Howship's lacunæ appear at the margins of the bony trabeculæ as seen in Fig. 2. As the bone is removed, both it and the intervening marrow are replaced by a well formed fibrous tissue without exudation or inflammatory cell infiltration. While some bony trabeculæ are being removed by the osteoclasts new ones are being laid down by osteoblasts. This new bone exhibits alternate denser and less dense layers, the dense being narrow and staining deeply with hæmatoxylin, giving a mosaic-like structure somewhat similar to the rings seen on a cross-section of a tree trunk. This mosaic structure was first described by Schmorl and is regarded by him as characteristic of Paget's disease. It is found in no other bone condition. Later on local necrosis of bone occurs with subsequent liquefaction and formation of cysts (Fig. 3). It may be, as is suggested below, that this is consequent on narrowing of vessels from arteriosclerosis.

The *x-ray findings* are in conformity with the above bony changes. In the early stage there is absorption of bone (osteoporosis) with, later on, the appearance of new bone replacing the old. Of this new bone the radiologists (Shanks,

Kerley and Twining[8]) distinguish two forms called spongy and amorphous. Both forms may be present in the same patient, although the spongy form is more common. It consists of coarse, irregular striæ arranged either as parallel trabeculæ or running in the direction of the normal lamellæ of a cancellous bone. The amorphous form is a generalized opaque deposit producing a granular mortar-like appearance in the skiagram.

ASSOCIATED CONDITIONS

The most constant of these is arteriosclerosis. This is usually of the Mönckeberg type, with calcareous deposit in the middle coat of the vessels. There is also thickening of the intima with consequent narrowing of the media. Sequelæ of this arteriosclerosis are to be found in various organs, heart, kidney and brain, and, as has already been mentioned, there is some reason to believe that the necrotic cysts of the bone may be due in part to the resulting interference with vascular supply (Fig. 3). The calcareous deposit in the vessel walls of the lower limb especially is often visible in the skiagram.

In his original paper Paget drew attention to the frequent association of "cancer" with this disease. Out of his first series of five cases he found cancer in three. In the first case of all, described in great detail by him, a cancerous growth appeared in the upper third of the left radius within a month or two of death and at the autopsy cancerous deposits were found in both lungs. So far as one can gather from a study of the illustrative drawings of the tumour, the growth was probably a carcinoma originating in the lung with a metastasis in the left radius. Another of the Paget cases showed

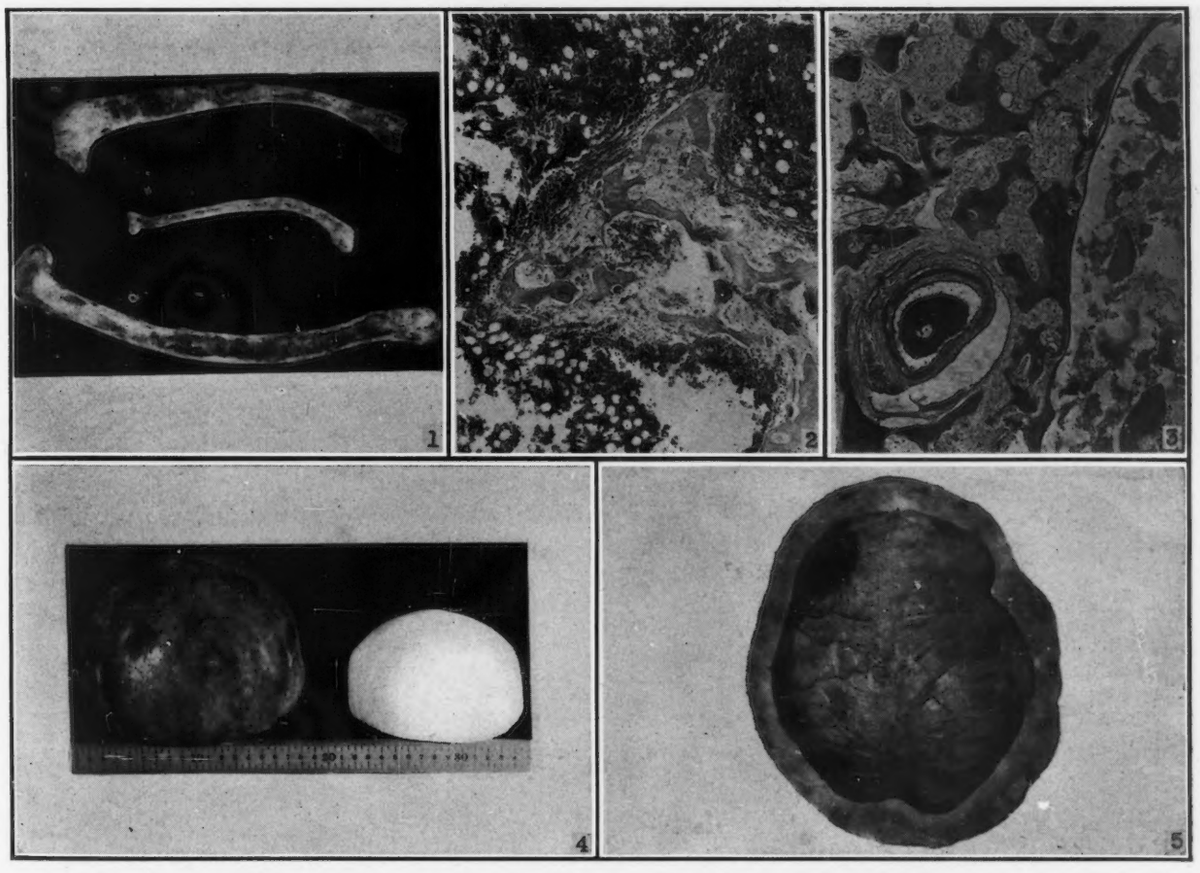


Fig. 1.—Tibia, radius and femur from case, showing thickening and bending of the bones, loss of distinction between compact and spongy bone with areas of vascular marrow interspersed amongst new bony trabeculæ. **Fig. 2.**—Early bone lesion in Paget's disease. Removal of bone by osteoclasts (large dark cells) and replacement of bone and marrow by fibrous tissue. **Fig. 3.**—Advanced lesion of bone with well-defined cyst containing necrotic bone and debris, right. Bony trabeculæ showing mosaic structure and connective tissue filling intervening spaces, also thickened vessel with calcareous deposit in media to the left. **Fig. 4.**—Anterior view of calvarium contrasted with calvarium of normal female. The latter has of course been macerated. The vascularity and roughness of the former is seen. A dark area in the frontal lobe was soft enough to be pierced with a knife. **Fig. 5.**—Section of calvarium viewed from below. Note the great thickness of the bone, the disappearance of the distinction between outer and inner tables and diploë; also soft vascular areas, dark in appearance, particularly the one in the frontal bone seen above and to the left.

what he calls an epithelioma of the arachnoid surface of the dura mater of the brain, which was probably a meningioma (psammoma), and, therefore, not malignant. It is interesting that in the case described below there were two tumours, a carcinoma of the pyloric end of the stomach and a small meningioma of the cerebral dura mater. In several of the cases in literature which have come to autopsy cancerous growths and simple tumours (Sternberg[9]) have been recorded. There is a further association between sarcoma and Paget's disease. Jaffe states that about one in ten of the more diffuse forms of the disease shows complications with sarcoma. This sarcoma is often widespread in the bones. From the other standpoint, in 71 cases of osteogenic sarcoma (Shanks, Kerley and Twining[8]) osteitis deformans was present in 28%. Further, in all of these cases the bone disease preceded the development of the sarcoma by ten or fifteen years. There appears, therefore, to be a definite association between Paget's disease and malignant neoplasia, the bone dystrophy being the earlier condition.

Blood chemistry.—Jaffe[3] states that the only chemical test of any value is the serum phosphatase. This test frequently shows high values, sometimes up to twenty times the normal. Further, the more severe and widespread the case the higher the value. The explanation of this high serum phosphatase is not clear. It is probably associated with the formation of new bone rather than destruction of the old. The test, however, is not specific. High values have also been reported in generalized osteitis fibrosa cystica and in rickets.

The levels of serum calcium and serum phosphorus are normal, which is remarkable in view of the considerable destruction of bone which is going on, and in view of the deposit of calcium in the arterial walls. In contrast to this, in osteitis fibrosa cystica and in rickets the serum phosphorus is lowered, while the serum calcium is raised in the former disease and normal in the latter.

The following is the new case brought forward. For the notes I am indebted to Dr. C. M. Crawford and the staff of the Ontario Hospital, Kingston.

The patient, E.S., was born in the south of England in 1870. She was a widow and previous to marriage worked as a weaver. She was a member of a family of six, four girls and two boys. There is no record that either of the parents suffered from bone disease, but all four sisters have developed symptoms suggestive of Paget's disease; and one, who is resident in Canada, has distortion of most of the bones of the body and has had repeated spontaneous fractures. There are no precise data as to the onset of the disease in the patient, but it was apparently well marked in 1928. She was admitted to Rockwood Mental Hospital in 1940 and died in March, 1942. The diagnosis in her case was senile psychosis with simple deterioration. Clinical pathological observations carried out during hospitalization were as follows: serum calcium 10.2 mgm.; blood urea 24 mgm.; hæmoglobin 60%; red blood cells, 2,580,000, leukocytes 5,760. The Wassermann test was negative. No observations were made on the serum phosphorus or serum phosphatase.

The relevant autopsy findings were as follows: The calvarium was enormously enlarged, measuring 63.5 cm. in circumference. When removed, it weighed 1,740 grm. It varied in thickness from 1 to 3 cm. (Figs. 4 and 5). The distinction between diploë and outer and inner tables had disappeared, the whole bone being transformed into soft osteoid material, red in colour and easily cut with the saw, and some parts with the knife. The spine showed well marked kyphosis in the dorsal region. The long bones—radius, ulna, femur and tibia — were bent, thickened and softened, and the marrow of the shafts was red and partially occupied by soft bone (Fig. 1). The stomach showed a large ulcerating carcinoma in the region of the pylorus and there was a small rounded meningioma attached to the dura mater over the left frontal area 3 cm. from the middle line. There was atheromatous change in the aorta and the coronaries, and the arteries generally, especially those of the lower limbs, were extensively calcified. In regard to the endocrine glands, the adrenals were large, but normal, and the pituitary was flattened, as was also the brain, by a projection upwards of the base of the skull; the thyroid was small and showed nothing of note microscopically; the parathyroids were dissected out and found to be normal as regards gross and microscopic appearances.

Microscopically, the bony changes were in conformity with those usually found in Paget's disease, the only unusual feature being well marked calcification of the media of the arterioles in the substance of the bone itself.

SUMMARY

A case of Paget's disease of bone is presented and the nature and pathology of the condition is discussed. The only unusual feature of this case was the occurrence of an osteodystrophy, apparently of a similar nature, in several members of the same family. A point not hitherto observed in such cases is the association of arterial disease in the bones with the necrosis and cyst-formation which commonly occur.

REFERENCES

1. ASCHOFF, L.: *Verhand. der deutsch. path. Gesell.*, 1909, **13**: 119.
2. BELL, E. T.: Text-Book of Pathology, 4th Ed., Lea & Febiger, Philadelphia, 1941.
3. JAFFE, L.: *Arch. Path.*, 1933, **15**: 83.
4. KERR, J. W.: *Pub. Health Bull.*, U.S. Training Dept., Washington, 1933, No. 209.
5. KOCH, M.: *Verhand. der deutsch. path. Gesell.*, 1909, **13**: 107.
6. PAGET, SIR J.: *Trans. Med. Chir. Soc. Lond.*, 1877, **60**: 37; *ibid.*, 1882, **65**: 225.
7. SCHMORL, G.: *Verhand. der deutsch. path. Gesell.*, 1926, **21**: 71; *ibid.*, 1930, **25**: 205; *Virchow's Arch.*, 1932, **283**: 694.
8. SHANKS, KERLEY AND TWINING: Text-Book of X-Ray Diagnosis, Lewis, London, 1939.
9. STERNBERG, C.: *Verhand. der deutsch. path. Gesell.*, 1907, **10**: 137.

NIGHT VISION*

By D. Y. Solandt and C. H. Best

THE retina or light-sensitive surface of the eye contains two types of structures which are affected by radiant energy. The cones provide the visual sensitivity at all except the lowest levels of light intensity and are distributed throughout the retina, being grouped most densely in the foveal and central regions. The rods, found in the paracentral part of the retina, are sensitive to very low intensities of light and are paralyzed for an appreciable time by higher intensities.

In the armed services personnel engaged in night operations must frequently glance at instruments or charts, make certain readings, and then look out into the surrounding darkness. When the eye is subjected to increased illumination, as when charts are being read, adaptation is very fast. On decreasing the illumination, however, adaptation is relatively slow, the speed depending on the intensity and the colour of the previous illumination. This lag in adaptation is observed as a momentary blindness at the time the observer looks away from the chart. To reduce the duration of this blind period the intensity of chart table illumination is often cut down to a point where quick, accurate reading of the chart is impossible. It was thought that the use of the optimum colour for illumination might modify the need for this undesirable reduction in intensity.

The experiments of Breuer and Pertz in 1897 showed that foveal sensitivity is less than paracentral sensitivity for white light or for any colour of light except red. The foveal sensitivity to red light is, on the other hand, greater than the paracentral sensitivity to this colour. These findings have been verified by many workers. In the case of bridge personnel aboard a ship the foveal vision is used for the examination of instruments and charts and paracentral vision is most important in seeing in the dark. For these reasons it would be appropriate, on theoretical grounds, to light instruments and chart tables with the colour of light to which the fovea is most sensitive and the paracentral region least sensitive. This ideal cannot be attained, but red light offers the best compromise.

USE OF RED LIGHT

The above considerations apply equally to personnel operating aircraft, and indeed our first application of red lighting was made to aircraft instrument panels. At the suggestion of Professor A. V. Hill, then British Air Attaché in Washington, experiments were made in the laboratory on the lighting of airplane instrument boards. Favourable results were obtained, using deep red illumination, and these experiments were reported to Professor Hill, to Air Commodore Baker of the R.A.F. and to the National Research Council, Ottawa. At the time this work was being carried out and unknown to us, Dr. H. K. Hartline, of the Johnson Foundation, University of Pennsylvania, had undertaken a similar line of work and had come to the same conclusions. He made precise measurements of the advantage to be gained with different wave-lengths of red light. This information, which he kindly put at our disposal, has been used by us in all subsequent work.

Actual night trials in R.C.A.F. aircraft were carried out in November and December, 1940, and January, 1941, under the direction of Wing Commander T. R. Loudon and with the collaboration of the late Squadron Leader Evan Briggs. Reports from the test pilots and the research personnel carrying out the investigation were favourable, and a final report, recommending the adoption of a specified form of red instrument panel illumination for aircraft, was made to the N.R.C. (Ottawa) and the R.C.A.F. in January, 1941. In February, 1941, at the request of the United States Navy, the experimental results were presented to United States Naval Air Service authorities in Washington.

In March and May, 1941, following the principles derived from our work on aircraft, red bridge lighting was tried on ships of the Royal Canadian Navy. In July, 1941, a full report was made on the results obtained at sea and on a chart table test in the gunnery school at Halifax. Sea-going personnel of the executive branch were enthusiastic about the results. Lights and filters for equipping 5 naval vessels were provided from the Best Medical Research Fund of the University of Toronto. Further tests were carried out at sea in October, Novem-

* From the Royal Canadian Navy Medical Research Unit.

ber, and December of 1941 and a final detailed report, including specifications for all lighting installations involved, was submitted to the National Research Council and the Royal Canadian Navy in January, 1942. These recommendations have now been incorporated in operational orders. All new vessels and all vessels being refitted are to be equipped with red lighting following the directions furnished by the Medical Research Unit of the Royal Canadian Navy.

In November and December of 1941, as members of the Royal Canadian Navy Medical Research Unit, the authors spent some time with the Home Fleet of the Royal Navy. Royal Navy reports seen at that time indicated that red lighting had been proposed, as early as 1936, by Dr. Cheshire, of the Admiralty Research Laboratory, Teddington. However, after limited sea trials investigation along this line was apparently terminated. In November of 1941, Admiral Sir John Tovey and Surgeon-Captain Fitzroy-Williams reviewed with us the Canadian experiments and requested that the Admiralty reopen the question. Red lighting has now been adopted by the Royal Navy.

RED GOGGLES

Red goggles, first employed by the British armed services, are a helpful addition to the use of red lighting. The goggles may be worn by personnel for 30 minutes before going on watch and thus eliminate the need for a long period on deck before taking over the duties of the watch. Red goggles must fit well, as a small leak of white light can ruin their effectiveness. Such goggles have been used successfully in trials under service conditions in the R.C.N., and they are now available for distribution to ships.

Red light stimulates the rods of the retina less than any other colour. However, it has some effect on them and for this reason the red light should always be as dim as is feasible under the working conditions involved. Furthermore, a light which appears red to the unaided eye is not necessarily satisfactory. For best results the red light must, on spectrographic examination, show little or no energy output at a wavelength below 6,000 or, preferably, 6,200 A°. These criteria of intensity and wavelength apply both to sources of red illumination and to the filter material to be used in red dark adaptation goggles.

It is common experience that seeing in the dark is best accomplished by not looking directly at the object to be seen. This is the case because the central or foveal part of the retina contains no rods. An object dimly seen in the peripheral visual field will "disappear" when any attempt is made to look directly at it. Night-lookout personnel must be instructed in the practical applications of this phenomenon.

ADAPTATION TO DARKNESS

Red lighting and red goggles facilitate the maintenance of dark adaptation. However, the maximum possible adaptation differs in different individuals. Some people are night-blind from birth, others acquire a permanent night vision defect, possibly through a dietary deficiency, and others show a temporary defect which may be due to fatigue, diet or other causes.

The necessity of measuring the dark adaptation of naval personnel is obvious. As previously mentioned, those employed on lookout duty at night are often working under conditions of extremely low illumination. To operate effectively in such an environment it is necessary that the function of the rods in the retina be normal or better than normal. Many dark adaptation tests have been devised in the past 10 years. Most of these attempt to test several factors in addition to rod sensitivity. In elaborating a test for use by the R.C.N. it seemed to us advisable to use a procedure which would test rod-function alone because most of those tested would be personnel with little or no training in the technique of night vision. It was thought that a simple test of rod-function would indicate whether a subject was suitable for special training in night vision.

With these criteria in mind most of the dark adaptation tests in use in the British Isles and in the United States were scrutinized. While it was recognized that a group test would be, in some respects, preferable to an individual test, the experience of Dr. Kenneth Craik, working on British Army personnel, indicated that a group test led to confusion and consequent non-reproducibility of results. This objection could probably be overcome by automatic recording equipment which would enable the whole test to be carried out in complete silence. Such equipment is, however, cumbersome and costly. It was thought that the individual test would probably answer the requirements of the particu-

lar conditions encountered in the Navy better than the group test.

Since the measurement of dark-adaptation is at best complicated by a number of inherent inaccuracies, a device designed to measure rod-function as precisely as possible was adopted. Of the machines used to measure rod-function, and that alone, the Hecht-Shlaer adaptometer was found to be most suitable. It provides means for an accurate standardization of the test light source, an accurate timing of the flash of test light (0.2 seconds) and a system of optical wedges for varying the intensity of the test light presentation. The test light spot subtends an angle of 3° on the retina. A red fixation point, displaced 7° from the test spot, is also included. The original instrument tested was made for monocular vision and carried the controls placed on the top of the machine. At the suggestion of the R.C.N. Medical Research Unit, a modification of this instrument, later named the Hecht-Shlaer R.C.N. adaptometer, was designed and built in Professor Selig Hecht's laboratory at Columbia University. This instrument has all the controls on a rear panel where they can be manipulated conveniently by the operator. The machine is equipped for binocular presentation. The shutter is of an improved design, gravity operated, with convenient means for locking and resetting provided. The intensity of the test spot can be varied smoothly from 1.5 to 4.5 log. micro-micro-lamberts. The machine houses its own battery which is adequate for short periods of use. Provision is made for connecting to a standard 6 volt storage battery when the adaptometer is in continuous use.

Instruments of this type have been in extensive use in Halifax for some time and have proved completely satisfactory. Where several machines are to be operated in one dark room a curtained booth is provided for each machine. Under such conditions a key, placed in the subject's side of the booth and connected to flash a dim red light in front of the operator, is used to indicate the response of the subject.

To facilitate handling large numbers of men a special suite of rooms has been built in connection with the Naval Service Hospital at Halifax. This includes an outer waiting-room where the men are received, a dark-adaptation room with seating accommodation for 50 men, a dark test room, and space for conducting other vision tests. In the waiting-room the subjects are given a preliminary talk which is chiefly devoted to an explanation of the nature of the test and is designed to enlist the co-operation of the subjects. The name, number, rank and ship of each subject is recorded on a special form. He is then given the Ishihara Colour Vision test and the R.C.N. Visual Acuity test. The time is entered on a sheet and the subject is told to pass into the dark adaptation room by way of a light-trap maze. The dark room attendants are provided with flashlights equipped to give a dim red illumination with little or no energy output at any wavelength below 6,200 A°. These lights, when in use, are kept directed towards the floor. After 45 minutes in the dark adaptation is assumed to be complete and the men are conducted one at a time to the test instrument in the adjoining dark room. The subject receives his instructions, is tested as described below, and then led to an exit maze, and through this finds his way back to the outer office. If he has failed on the Ishihara Colour Vision test he is given an R.C.N. Colour Vision Lantern test before returning to his duties.

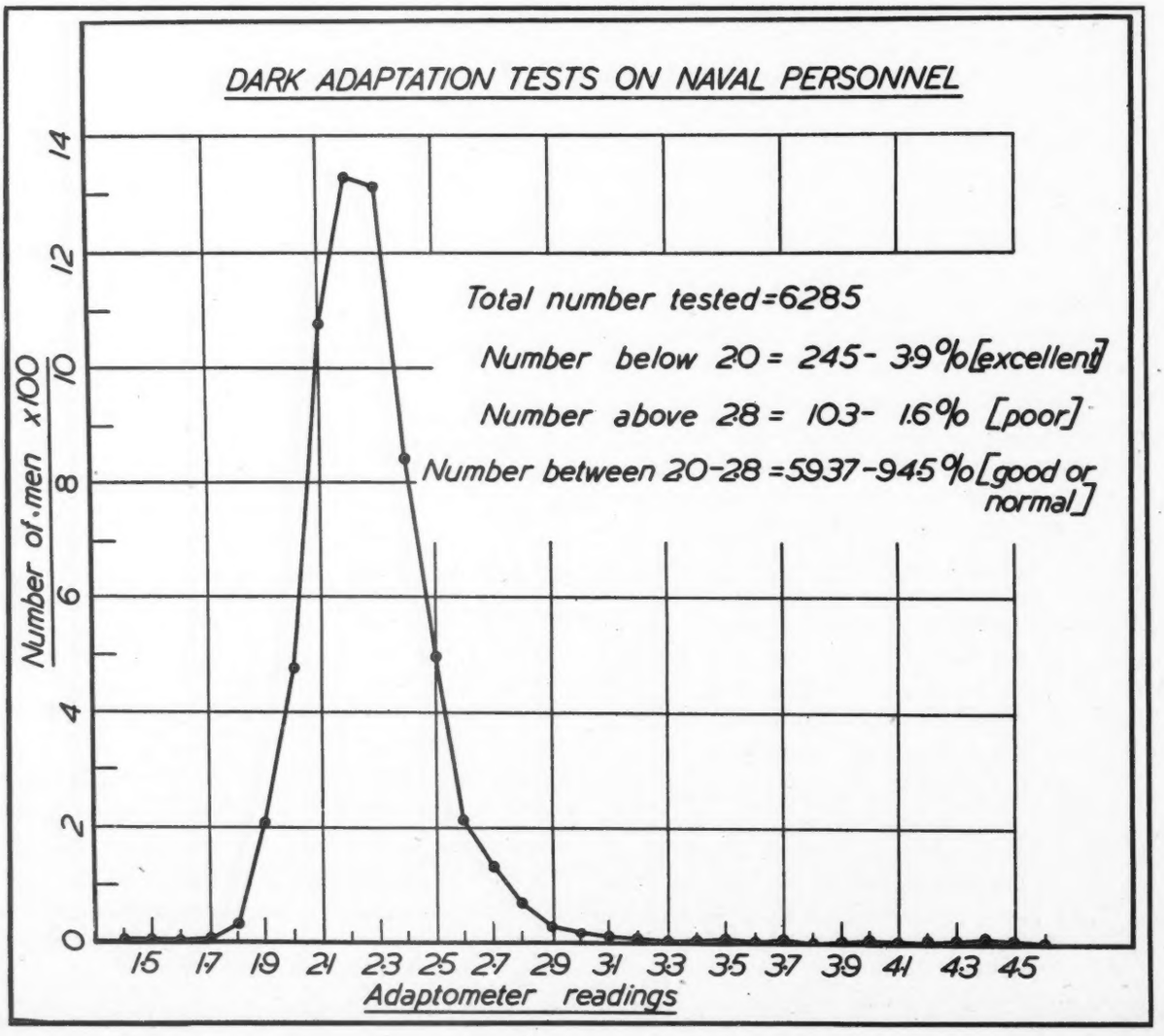
In carrying out the dark-adaptation test the candidate is directed to look into the tube attached to the side of the adaptometer remote from the operator and is asked to fix his eyes on the dim red light which is seen. He is then told that, when the shutter clicks, he will or will not see a flash of light below the red light. If he sees a flash of light he is directed to press the key, on which his hand has been placed, and if he sees nothing he is told to do nothing. It is emphasized that at all times he is to keep his eye on the red light. Caution to this effect is given verbally at periods throughout the test and is the only conversation which need take place during the test. With the subject in position the operator then proceeds to present a relatively bright flash of test light (4.0 log. micro-micro-lamberts). Repeated stimuli of decreasing intensity are then given with not less than 5 seconds between stimuli.

The first test is limited to bracketing the individual within 0.5 log. micro-micro-lamberts. He is then told to rest for half a minute and the test is repeated, this time working within the 0.5 log. micro-micro-lamberts which was previously found to include his threshold. Again he is allowed to rest half a minute and another test is carried out. If the results check

no further tests are made and the candidate is conducted out of the dark room. A test carried out in this manner occupies from 3 to 5 minutes. Over 6,000 men have now been tested with such an instrument and it has been found quite feasible to handle 12 men with a single instrument in one hour and to maintain this rate for a working day with adequate rest periods for the operators.

The frequency distribution curve obtained by plotting the results of tests on 6,285 subjects is shown (see Chart). It is seen that the mode (the final value most frequently obtained) is 2.2 log. micro-micro-lamberts. For decreasing values below 2.2 the number of men in each one-tenth log. micro-micro-lambert group is rapidly reduced. Of the subjects tested 245 or 3.9% obtained scores below 2.0 and might be considered to have supra-normal rod sensitivity. At 1.8 only 34 men are listed and at 1.5 only 2 men. Above a reading of 2.2 the curve approaches the base line more gradually. Actually, the frequency curve levels off above 3.2 and 1 to 8 individuals are to be found at successive readings up to 4.5, the upper limit of the scale of the instrument. If 2.8 is arbitrarily selected as the upper limit of normal night vision, then 103, or 1.6%, of the 6,285 men may be said to have subnormal night vision. This group of 6,285 subjects included many from ships and some night-blind individuals had probably been eliminated before the test was performed. Of the first 2,049 subjects tested nearly all were new recruits and 3.2% of these gave values higher than 2.8.

As a measure of the reliability of the results the test was repeated on successive days for 6 to 8 days on a group of 18 men. A similar test was carried out on 34 men to compare the results obtained on successive weeks. The results obtained in these 2 series, including 52 men, indicate that there is no greater variation in



the weekly than in the daily tests. In both cases the standard deviation was calculated for the results of each man and was found to vary from 0.06 to 0.17. Thus the chances of any one result differing by 0.2 log. micro-micro-lamberts from the average of a series of such tests is not greater than 1 in 20.

For naval purposes men are grouped in categories "poor" (above 2.8 log. micro-micro-lamberts), "good" or "normal" (2.0 to 2.8 log. micro-micro-lamberts) and "excellent" (below 2.0 log. micro-micro-lamberts). Thus the upper limit of normality is placed at approximately 3 standard deviations (maximum) above the mode and the lower limit, the less important dividing line, 2 standard deviations below the mode. These divisions may be altered at any time and the change made retroactive as the exact reading on every subject is listed and retained. There is a real and unavoidable chance that the border-line cases will be placed in one group on one day and in another group on a successive day. The present instrument, however, renders the measurement of rod sensitivity as precise as known physical means can make it and in practice the reproducibility of results is very satisfactory.

SUMMARY

We can state that it is now possible, with red lighting and red goggles, to shorten the period necessary for dark-adaptation. Red lighting may be employed to protect the night vision of personnel who are dark-adapted and on duty. Adaptometer tests can be used to weed out the highly dangerous night-blind individuals and to select personnel with exceptionally good night vision for special training in night duties.

The authors would like to express their appreciation of the support given to them in this work by Surgeon-Captain A. McCallum, M.D.G., R.C.N. They are also indebted to Surgeon-Lieutenant Carlton G. Smith and Sub-Lieutenant John Dales who carried out much of the routine work in connection with the measurement of night vision.

The dangers of the unwise use of tourniquets are so real that Mr. R. Watson-Jones, M.Ch., F.R.C.S., Liverpool Royal Infirmary, has suggested reconsideration of the question as to whether tourniquets are ever necessary in first-aid work. He states that man does not bleed to death from complete severance of an artery, since control is effected by arterial spasm—even more effectively than it is by a tourniquet. In his opinion limbs and lives are being lost by leaving tourniquets in the hands of unskilled first-aid workers, and he advises that they should be removed from first-aid equipment and that ambulance men should be taught the methods of pressure bandaging.—*J. Roy Inst. Pub. Health & Hyg.*, 1943, **6**: 56.

PRESENT VIEWS ON THE ETIOLOGY AND TREATMENT OF SHOCK*

The Address in Medicine before the Royal College of Physicians and Surgeons of Canada

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THE compliment bestowed on a Fellow to deliver one of these annual lectures should be a cherished memory. For this reason I wish to thank our President that I am a privileged one, although I am conscious of the fact that many of you may consider it presumptuous that I have accepted the task. My only excuse and apology rest in the philosophy that the fundamental processes of Medicine and Surgery stem from a common root. If we, as members of our common profession, are realists, we must accept that we are all physicians. The contention that either branch is an exclusive realm unto itself is not only ridiculous but detrimental to common progress. There is no field in which this is so glaringly apparent, but where the blinkers have been so persistently present, as in the subject with which I am dealing today. I propose to give my own interpretation and philosophy for what it is worth; otherwise I would consider myself faithless to this honour and this task.

Men die! Some with catastrophic suddenness, others after a few hours or days, and finally those who through some progressive condition do so eventually but, withal, suddenly. In the first instance the cause of exit is disputed but, nevertheless, it occurs for some undetermined specific reason. The brain, the heart, or the medulla oblongata have been accused. This may be so, in isolated instances, but these excuses do not satisfy the critical mind. However, it is not with these that I wish to deal today. There is not time to discuss this realm of speculation and tradition.

I shall confine my remarks principally to the second group where there is a delayed but progressive advance to dissolution, although the tide may be reversed and recovery occur.

I think it would be well to define what is meant by this word "shock". This is a task from which I crave to be excused. I shall outline the symptoms and signs by which we recog-

* Delivered at the thirteenth Annual Meeting, Ottawa, October 24, 1942.

nize the condition, but this does not lead us to the fundamental disturbance and its initiation. The clinical condition is well known to us all. I would contend that it is too inclusive a term. I think we will all agree that it is a pot-pourri of many unrelated and often uncorrelated signs and symptoms. If death occurs and we have no more ready explanation, it is attributed to "shock". The primary conditions initiating it may be most diverse, but yet the word is used indiscriminately.

What are these symptoms and signs which are so impressive but yet so confusing? They may be divisible into six groups:

TABLE I.

(*a*) Nervous — early anxiety, physical restlessness, mental lethargy, neuro-muscular atonia, and finally unconsciousness.
(*b*) Cutaneous—sweating, cold skin, mottled cyanosis, and decreased dermal elasticity.
(*c*) Gastrointestinal—nausea, vomiting, tympanites and constipation.
(*d*) Circulatory—tachycardia, slow capillary circulation, lowered venous pressure, venule stagnation, and, finally, precipitant low systolic and pulse pressure.
(*e*) Respiratory — rapid, shallow respirations with interspersed deep sighing, decreased vital capacity, and fine moist râles indicating œdema of the lungs.
(*f*) Hæmatological — leucocytosis, lowered plasma proteins and increased erythrocyte count and hæmoglobin, indicating hæmoconcentration.

It must be emphasized that the first five groups are usually present to some degree, but the sixth, or hæmatological, may or may not occur, depending upon whether or not there has been whole blood loss. The emphasis placed upon the importance of this finding has led to much confusion, and to false conclusions as to the rigidity of therapeutic measures.

There is little dispute concerning the clinical picture or syndrome. The controversy has been waged around the cause or primary physiological derangement to account for it. This has been assisted by the multiplicity of adjectives appended to the term shock, such as surgical, secondary, hæmorrhagic, traumatic, dehydration, burn, etc. Such descriptive terms only serve to indicate that a serious, even fatal, condition may follow these events. It would be further confused if we used pneumonic, typhoid, meningococcus, or coronary artery shock, etc. In the terminal twelve to forty-eight hours of these diseases the whole essential picture of shock is reproduced with great fidelity. It must therefore be accepted that shock is a disruption of the normal physiological balance which is the precursor of somatic death unless it be amenable to treatment which can reverse the reaction.

There was a time when various expressions were used which indicated the belief that the heart was the principal organ at fault. This was as prevalent in medical circles as with our surgical colleagues. A review of hospital records even up to recent times reveals that the most favoured diagnosis for the immediate cause of surgical deaths in patients over forty was "myocarditis", whatever that may mean, as it is a relatively rare anatomical diagnosis except in rheumatic fever, scarlet fever, diphtheria and trichiniasis. But this is an indication that to all minds the heart appeared to be the pivot, the dislocation of which disorganized the whole somatic balance.

After the introduction of the sphygmomanometer our thoughts were slowly, ever so slowly, directed to the belief that a falling blood pressure and shock were synonymous. This is to some degree correct, except that the real condition of shock has been initiated and has travelled well along its course before this spectacular and exact physiological disturbance occurs. It should be considered as one of the later findings to indicate this condition. It occurs after all compensating mechanisms to maintain the circulation have failed. It is for this reason that in medical parlance the terms peripheral vascular, or circulatory failure were introduced; not that we wished to be different but rather that the resemblance to "shock" was not sufficiently appreciated. We are therefore dealing with an almost universal prelethal state which at times may be reversible spontaneously or by therapeutic procedures.

Up to this point we may expect fair agreement, but when we come to explore what this condition really is and follow the trail backwards, we come into a maze of conflicting opinions. Many serious students of this subject have figuratively thrown up their hands in literal defeat as to how and where this process is initiated. There have been numerous theories, but none of them so far have withstood critical and experimental exposure. Let us not confuse the important secondary disturbances of physiological equilibrium with the primary cause which antedates these.

HISTORICAL

Perhaps it would be well at this point to recite a brief history of our knowledge of this subject.

It was James Latta (1765), of Edinburgh,

who first used the word "shock", and his original description was a vividly worded picture. It was retouched here and there in the following century but only as to clinical details. During the closing third of the last century men's minds were directed to its cause both by speculation and meagre experiment. Some of their findings have been of permanent worth, such as hæmodilution after hæmorrhage (Sherrington and Copeman), and hæmoconcentration in some other conditions associated with shock. Turck was the first to emphasize the importance of cold as a contributing factor. The contention of Fischer that there was always vasomotor exhaustion and pooling of the blood, was found to be limited in its conception to manipulation of the abdominal viscera, and was by no means constant.

During the first World War there was a much greater stimulus to the investigation of the subject. The work done then and the conclusions drawn are well presented by the report of the Allied Shock Committee, edited by Professor Cannon, and published in 1923. This seemed to satisfy most men's minds, but there were a number of skeptics and ardent experimenters in the clinical field who were not satisfied, and amongst these the arguments waxed ardently, and sometimes with a certain acrimony. On looking backwards it appears that these differences of opinion were sincere, but based on differing premises as to the conditions present. There was probably only one common agreement, which was, that shock occurred too frequently and most patients died who had a florid complexion. There was no disagreement as to the general clinical picture; but, there was as to etiology and to the sequence of events. Further, the question always arose, which was cause and which was effect. I herewith present a tabulation of these different theories for which I am indebted to Henry N. Harkins in his excellent review of this subject.* (See Table II.)

These theories I now place before you as impartially as I can. For none of them have I a brief, nor do any of them convince me as being proved.

A nervous etiology dates from the middle of the last century. In fact, it was the first to be advanced when men's minds changed from clinical description to causative curiosity. It will be noted that most of these theories have their

TABLE II.

THEORIES OF SHOCK

1. Nervous
   - Vasomotor exhaustion
     - Mitchell, Morehouse, and Keen (1864)
     - Fischer (1870)
   - Exhaustion
     - Crile (1897-1920)
     - O'Shaughnessy and Slome (1935)
   - Inhibition
     - Meltzer (1908)
2. Fat embolism
   - Bissell (1917)
   - W. T. Porter (1917)
3. Arterial vasoconstriction and capillary congestion
   - Mapother (1879)
   - Malcolm (1893-1909)
   - Starling (1918)
   - Erlanger, Gesell, and Gasser (1919)
4. Acapnia
   - Henderson (1908)
5. Acidosis
   - Cannon (1919)
6. Hyperactivity of adrenal medulla
   - Bainbridge and Trevan (1917)
   - Freeman (1933)
7. Exhaustion of adrenal medulla
   - Sweet (1918)
8. Adrenal cortical insufficiency
   - Swingle, Pfiffner, *et al.* (1933)
9. Traumatic toxæmia
   - Cannon, Bayliss, and British Medical Research Committee (1918)
10. Traumatic metabolites giving capillary atony and tissue anoxia
    - Moon (1932-1938)
11. Local fluid loss
    - Phemister (1927-1930)
    - Blalock (1930)
12. Progressive oligæmic anoxia
    - Harkins (1940)

antagonists, as, for instance, in (1) there is vasomotor exhaustion and in (3) arterial vasoconstriction; in (4) acapnia, and in (5) acidosis; in (6) adrenal medullary hyperactivity, while in (7) and (8) exhaustion or insufficiency of the adrenal medulla or cortex are accused. Traumatic toxæmia and traumatic metabolites would appear to be more or less synonymous. Local fluid loss and progressive oligæmic anoxia, both of which are known to occur under certain conditions, could be grouped as cause and effect, as most probably they are. This leaves only fat embolism. That such an accident may produce a shock-like state cannot be denied, but so can air emboli. But these occurrences are relatively rare and occur under specific circumstances, and need not detain us further.

There are, however, two additional theories which should be mentioned. Yandell Henderson and his co-workers have brought forward the thesis that under adverse conditions there is a loss of "muscle tonus". The efficacy of this is a most important factor in the maintenance of venous circulation; in fact, it might be visualized as the "peripheral heart". It is under the

* Reprinted from *Surgery*, 1941, 9: 231, 447, 607.

influence of the spinal centres and is a further extension of the sub-sections of (1), exhaustion and inhibition. The other theory is that of Selye which is the antagonist of (9) and (10); namely, that there is a deficiency of some vital substance, perhaps, an enzyme which trapped in damaged tissues or lost through hæmorrhage is essential for somatic life.

Any one can take his choice among these theories, each one of which has had an experimental or clinical basis under particular conditions. But I would caution you to be careful not to confuse cause and effect. Changes in the central nervous and other systems and organs, both anatomical and functional, can be detected which may be the result of this elusive state called "shock" rather than the cause of it. It is this probability of putting the cart before the horse which has led to such confusion when conclusions are drawn from different premises.

PRODUCTION OF SHOCK

Therefore, let us review in a general way the methods whereby shock has been produced in the experimental field on the one hand and compare them with those in the clinical field on the other.

EXPERIMENTAL AND CLINICAL CAUSES (?) OF "SHOCK"

(*a*) Loss of body fluid	1. Trauma without or with demonstrable hæmorrhage
	2. Abdominal or other operations without or with demonstrable hæmorrhage
(*b*) Tissue injury	3. Hæmorrhage with or without trauma
	4. Dehydration
(*c*) Physical causes	5. Burns
	6. Cold
(*d*) Water and electrolyte deficiency	7. Addison's disease
	8. Physical exhaustion
	9. Ligation of artery and vein
(*e*) Infections	10. Infectious diseases
(*f*) Nervous insults	11. Coronary and pulmonary infarction
	12. Anæsthetics and narcotics

It is quite obvious with this grouping that there is an overlapping between the experimental and clinical misadventures which may precede or be apparently causative of this condition. It would be unrealistic to believe that all of them could lead to the same end by identical routes. There must be, however, somewhere a common thread that could tie them together and this is an intriguing and elusive problem. I cannot give you the answer, although others think they have solved the problem. I wish I were as confident. There is nothing, to my mind, so defeating to knowledge as to be convinced that one is right in spite of honest experimental and clinical arguments to the contrary.

TABLE III.

EXPERIMENTAL METHODS	CLINICAL CONDITIONS
1. Trauma	Crushing injuries
Hammering a muscle mass	
Tumbling a small animal in a cage	
2. Visceral manipulations	Abdominal and other operations
3. Hæmorrhage	Hæmorrhage
4. Dehydration	Dehydration
	Vomiting
	Diarrhœa
	Withdrawal of fluids
5. Burns	Burns
6. Cold	Cold with or without fluid lack
7. Adrenalectomy	Addison's disease
8. Physical exhaustion through prolonged exercise with low calorie and water intake	Physical exhaustion through prolonged exercise with low calorie and water intake
9. Prolonged ligature of artery and vein with eventual release.	Prolonged application of tourniquet with release
10. Administration of bacteria or toxins	Pneumonia, scarlet fever, meningitis, etc.
11. Fat and air emboli	Coronary and pulmonary infarction and fat and air emboli
12. Anæsthetics and narcotics	Anæsthetics and narcotics

Other conditions both experimental and clinical could be mentioned *ad infinitum* and *ad nauseam*, from which death occurs through "peripheral circulatory failure", although the purist might not label it "shock" according to his traditional acceptance of a rigid etiology which requires a specific adjective.

If we pause to review this list of experimental and clinical causes (?) we find that they are divisible into six groups:

Now, in all this maze are there any factual observations which may help us to even a partial understanding of what we are really dealing with. The clinical observations lead us to believe that the following may be present.

1. Capillary stagnation } Cyanosis and slow capillary
2. Tissue anoxia } filling after manual pressure.
3. Autonomic imbalance—sweating and cold skin.
4. Reduced venous pressure.
5. Local and pulmonary œdema.
6. Embarrassed circulation — tachycardia and falling blood pressure.
7. Cerebral anæmia—restlessness, drowsiness and unconsciousness.
8. Renal failure—oliguria.
9. Hepatic failure—jaundice.

To parallel these there are what might be called laboratory findings, which are as follows:

1. Erythrocytosis
2. Increased hæmoglobin percentage
3. Reduced plasma proteins
4. Reduced blood volume
5. Reduced blood chlorides
6. Increased blood potassium
7. Hyperglycæmia
8. Reduced blood histamine
9. Cortin-like substance in the urine
10. Reduced muscle tone

I do not mean to infer that these clinical and laboratory findings occur in every case. Indeed, I would be emphatic to the contrary, and here rests the elusive quality of this syndrome. Although the general trend is to somatic death, the sign-posts along the road are not by any means the same. With such a potpourri of clinical and experimental findings which do not always follow a definite pattern, how can we intelligently fix upon a common trigger mechanism, because all of these findings, so far as we know, are results in a varying vicious circle which eventually arrive at a common end.

We can labour the different etiological hypotheses to our heart's content; but, we have not at present sufficient evidence to bring us to a sane conclusion. But this should not lead us to despair and cynicism. There are so many diseases of which we do not know the cause—such as hyperthyroidism, hypertension, diabetes mellitus, pernicious anæmia, sprue, peptic ulcer, myxœdema, appendicitis, etc., which either by ablation or substitution therapy we can cure, or at least mitigate. So it is in the matter of shock. In order that we may approach the treatment of an individual case with a sane perspective, we must appreciate that although certain general principles apply there are variations in time and circumstance for which we must ever be on the alert.

I have already stated that I do not have the least conception as to what is the fundamental cause of shock. This confession, therefore, does not obligate me to hold a specific prevention or cure. But, on the other hand, it leaves the way open to discuss the substitution or symptomatic therapy which should be used under specific conditions. It is here that we fall down pathetically. The call is for a preventive or cure which will be applicable and efficacious under all these variable circumstances. Rule-of-thumb therapy is the downfall of the medical profession. By this I mean the habit of thought that given result "A", irrespective of its quality and quantity, "B" therapy must follow. If I can do nothing else today than demonstrate how unrealistic this is I shall consider myself rewarded.

It is a fallacy to consider a fall of blood pressure as the paramount sign of shock. I grant that it does occur, but it is a late occurrence. In fact, if it continues at a low level for over twelve to eighteen hours it is doubtful whether the process is reversible. It seems to me to hold about the same relative place as disease does to death. Disease may occur without death but death never occurs without disease; it is the terminal event. So under the conditions which we are discussing, a systolic blood pressure is a terminal event which if persisting for a certain time is irreversible.

This raises a point which is often overlooked, namely, the tissue damage which may occur during this period of intense circulatory stagnation. There is profound cellular anoxia, deprivation of carbohydrate, continuing dehydration, changes in the cellular hydrogen ion concentration, and many other functional disturbances of fundamental importance. The effect of these is well indicated by the jaundice, anuria, cardiac arrhythmias, cerebral disturbances, etc. These may not all be present in any one case but the continuing cases where the spark of life is barely maintained, although the organism is somatically dead, will exhibit increasing numbers of them. It is during this period that anatomical changes occur which may have led to the confusion in the different histological findings of many workers. They are not to be considered necessarily as pointing to the cause of shock, but could equally well be taken as the result of it.

DETECTION OF SHOCK

Having frankly acknowledged that I do not know, or at least will not accept any of the existing theories (see Table II) as sufficiently proved to account for the trigger mechanism or real etiology of this condition, what can be done to point a way to circumvent it? There has been

a constant cry for a sign to indicate when shock is imminent or impending. I do not believe any such index can be formulated. It is an extremely insidious progressive state which must be expected in many diverse conditions. To my mind the process occurs many times and is not recognized because the protective physiological processes are called into operation and the process is reversed, or else by accidental therapy the same thing occurs. I say "accidental" because no routine treatment will meet all conditions *in toto* but may in part and thus help the natural protective processes to reverse the reaction.

It is better therefore to accept, with discouragement, but not with despair, our ignorance and to try to work out a tentative program of procedure and therapy. This must, however, be constructed with the full knowledge that we are dealing with diverse conditions and that there must be a reasoned handling of each individual case. For instance, a man may be burned, crushed and frozen all at the same time. An unhappy combination I grant, but still a real one, in which the manifestations of the physiological derangements will almost certainly be confused and will require keen and analytical observation to untangle the therapeutic indications from hour to hour.

On referring again to Table III, either the experimental methods or clinical conditions can be arranged in four groups:

TABLE IV.

1. Fluid loss—
   - (*a*) Dehydration—(i) withdrawal of fluids; (ii) vomiting; (iii) diarrhœa; (iv) sweating.
   - (*b*) Hæmorrhage
   - (*c*) Burns
   - (*d*) Crushing injuries
   - (*e*) Abdominal operations
   - (*f*) Physical exhaustion
2. Tissue ischæmia—
   - (*a*) Crushing injuries
   - (*b*) Operations
   - (*c*) Prolonged application of tourniquet
   - (*d*) Coronary and pulmonary infarctions, fat and air emboli
   - (*e*) Cold
   - (*f*) Dehydration
3. Systemic intoxication—
   - (*a*) Infectious diseases
   - (*b*) Released tourniquet
   - (*c*) Anæsthesia and narcotics
   - (*d*) Dehydration
4. Addison's diseases and adrenalectomy—
   Relative dehydration

It will be noted that there is considerable overlapping in this arrangement. This is due to the fact that the insult is not always clear-cut. Hæmorrhage often occurs with trauma; crushing injuries may be accompanied by concealed hæmorrhage; while the amount of blood loss at an operation may amount to much more than the surgeon estimates.

Hæmoconcentration has been held by many as being the sole, or at least the paramount, index and grave contributing factor in shock. The first cannot be accepted, as shock occurs without it under certain conditions, especially with hæmorrhage. That it may contribute to circulatory embarrassment will be accepted. Further, it can occur without shock being present, as in burns and dehydration of vomiting and diarhœa. But here again we must not be dogmatic; as already mentioned, the early signs of shock are elusive but even with hæmoconcentration and without treatment none of them may be detectable.

The analysis of these different conditions individually may assist in explaining what I mean by individualistic treatment of these cases.

Fluid loss.—Dehydration from deficient fluid intake. This is the least complicated contributing factor. It cuts across all four groups because it may antedate other episodes or be continuous with them. There is little doubt that in war injuries there may be relative dehydration during the period of combat through sweating and continuing under certain environmental conditions, and made acute from loss of the water bottle, and even without this as so vividly shown by the wounded crying for water. It is now quite apparent that the high mortality from typhoid fever, pneumonia, infantile diseases, and other infections was in large part due to dehydration. The obvious remedy of this condition was water and more water by mouth if vomiting were not also present. Sweating as a cause of dehydration must be taken into account under many of these conditions. I want merely to emphasize that the loss by sweat during the early stages of shock and deficient intake sets up a vicious circle which can only end in disaster. Hæmoconcentration may be pronounced, but the reason should be quite obvious. Intravenous normal saline is the paramount therapeutic agent.

Vomiting as a cause of dehydration, and finally shock, is somewhat more complicated. The situation of simple dehydration (1 above) is repeated, in that intake is curtailed but addi-

tional loss is added which also carries with it electrolyte disturbances. The depletion of the body of chlorides (HCl) renders it liable to an uncompensated alkalosis. Therefore, added to the dehydration there is an even more subtle physiological disturbance. It must be tackled in its combined implications. We hear much about acidosis but the more insidious and less articulate state of alkalosis goes unrecognized. It is easily rectified by weak HCl acid or calcium chloride being added to the intravenous therapy. But its possible presence does not require elaborate apparatus and determinations. The slow respiratory rhythm, the early and accentuated signs of circulatory collapse, even tetany, which is often passed unnoticed by the uninitiated, should give the clues. Hæmoconcentration may be prominent.

Diarrhœa is a more complicated factor than is usually supposed. The causes of diarrhœa do not concern us at present except to emphasize that the character of the stools may give the clue as to an important difference between two classes. There is the simple one where water and a small amount of electrolyte is lost and the other where water, electrolyte and plasma protein are lost. In the first instance a simple dehydration occurs with hæmoconcentration and concentrated plasma proteins. This is usually found in the enteritis of childhood and the dysenteries. It is best rectified with specific antitoxin therapy and by normal saline therapy in adequate amounts. It is a simple equation of water plus electrolytes to the alkaline side.

In the "choleraic" diarrhœas such as Asiatic cholera and ulcerative colitis (whether amœbic or non-specific) there is a loss of water, electrolytes and plasma proteins. The last can well be assessed by measuring the total volume of the fæces and determining the protein content of an aliquot part. The arithmetical sum may reveal that twenty to one hundred grams of plasma protein (chiefly albumin) can be lost in one day. Obviously, such a depletion cannot persist for long. There may be hæmoconcentration, but this is more often masked by an accompanying anæmia, and through loss of alkali a moderate acidosis. What is, however, so often overlooked is the plasma albumin reduction and the reduction in circulating blood volume. So the expected hæmoconcentration may not be the warning. In the acute choleraic cases it may be so, which is providential. In the more chronic it will not be so, but in either, plasma or serum protein is emphatically indicated. So here we have water, electrolytes and colloids a necessitous substitution therapy.

Sweating as a cause of shock seldom occurs by itself. For example, a miner in a deep hot mine may lose as much as eleven pounds in a four-hour shift. If he drinks only water he gets "belly cramps", a sign of water poisoning, or, in other words, sodium chloride deficiency. The housewife's remedy in Great Britain or the Andes is a "quid" of salt and oatmeal or some other glutinous substance, to provide the necessary saline content.

Hæmorrhage.—The really uncomplicated cases of hæmorrhage occur from the gastro-intestinal tract and, today, occasionally from the lungs. In practically all other instances there is the probable complicating factor of trauma. But blood loss as such not only produces a dehydration, as discussed above, but also a loss of hæmoglobin with an acute anoxia. We are far too liable to become blasé about anæmia in either the acute cases or, also, in those of a more chronic type when we nonchalantly impose an added insult such as an operation or other physical strain. It would seem quite obvious that hæmorrhage must be met by whole blood substitution therapy. There are certain physiologists who have dogmatically stated that plasma proteins either in the form of plasma or of serum can be a worthy substitute for whole blood under these conditions. I take a humble but firm stand to the contrary. In spite of the almost fanatical use of whole blood for all and sundry, given in picayune amounts, I would make a strong plea for its intelligent use,—"an eye for an eye",—a litre for a litre. It is a sovereign remedy when used with intelligence. A simple equation requires a simple answer! To give saline in unreasonable amounts may restore volume temporarily but renders the body water-logged through decreased osmotic pressure, or the fluid is lost rapidly through the kidneys.

Burns.—Here is a rather unique condition best comparable with the choleraic forms of diarrhœa. Apart from infections which have a relatively late influence, the loss of plasma is the primary cause of systemic disabilities. Burns are an example of pure plasma loss, both externally and into the surrounding tissues. Hæmoconcentration occurs and, interestingly, may progress to a pronounced degree without

even the earliest suggestions of shock appearing. All the exact indices of an acute reduction in total blood volume are present, but still shock in other ways may not be apparent. As time passes, signs of shock may supervene, but this is late compared to the degree of hæmoconcentration. This would indicate that hæmoconcentration and reduction of blood volume are not necessarily the primary cause of "peripheral circulatory failure" under all conditions but may be a serious contributing factor. Patients may die from burns without the nervous, cutaneous, gastro-intestinal, and respiratory signs of shock, but in this case it is a late event.

The obvious therapeusis is plasma protien intravenously, either as such or as serum. It should be given early and continued regularly so as to keep the hæmoglobin percentage at least under 110%. Concentrated human albumin should have a rôle if given in proper amounts with fluids by mouth, subcutaneous route or vein; but, when these are omitted the risk of a still further tissue dehydration to maintain the circulating blood volume may be expected. It is not in the way of wisdom to substitute a lesser evil for a greater one.

Crushing injuries.—In this case we have to deal with a more complicated phenomenon. There is practically always whole blood loss. How much is hard to determine, as the amount in the tissues is masked and that lost externally can at the best be but roughly estimated. In a normal man a hæmoglobin percentage below 90 after injury indicates hæmorrhage. The amount may be further rendered indefinite by hæmodilution, which is a physiological response to maintain blood volume. Later loss of plasma into the injured area would naturally tend to counteract this, but the net result would be a balance between dilution and concentration, with a lowering of the plasma protein content and reduced osmotic pressure. This to some extent could be rectified by plasma or serum provided the hæmoglobin loss has not been severe. An acute lowering of hæmoglobin below 60% calls for whole blood. But even this may not prevent shock from developing with startling rapidity.

The experiments wherein a tourniquet is applied before and immediately after an injury, thereby preventing continued blood or plasma loss, introduces another factor. Indeed, the mere continued obstruction to all circulation may serve the same purpose. The malign effects are seen shortly after the circulation is released. Various opinions have been expressed to account for these (1) that the moribund tissues permit of a sudden loss of plasma into their substance, leading to hæmoconcentration and reduced blood volume; (2) that a toxic substance is eliminated by these tissues; (3) that some essential body for the maintenance of life is absorbed or adsorbed by these tissues, thus creating an acute deficiency state. Only the first condition has been factually proved but is not constant by any means. Cross circulation experiments would indicate the second or third are possible but, if either, which is it? When the pharmacology of histamine was described this was thought to give the clue, but the evidence would not stand critical analysis, especially when it was demonstrated that the practical disappearance of this substance from the general circulation was one of the earliest signs of impending shock, and its continuance was a bad omen. Could it be that histamine is a necessity for the maintenance of physiological balance? If so, its loss, wherever it may go, might deprive tissues of a vital necessity and, by implication, support a deficiency state.

Time does not permit me to deal with all the clinical conditions outlined in Table IV, nor to deal in detail with all the biochemical disturbances which I have enumerated, but there are a few which warrant an honourable mention.

I would draw your attention to a series of events which may accompany acute coronary or pulmonary infarction. The former is the better as a text. Here there is neither preceding dehydration, plasma loss, or hæmorrhage; but, shock or peripheral circulatory failure may occur in all its essential features, even to pain and fear. I would divide the possible course of events into three phases: (1) Death—which may be called instantaneous. (2) A lapse of some hours during which all the features of shock may develop in an irregular pattern, even with hæmoconcentration, and finally a rapid fall of blood pressure with exit. (3) Final exit may be delayed and the circulation be maintained at a level hardly sufficient to support life. This may continue for several days and then there may appear signs to indicate that the functions of other organs and systems have been injured, by prolonged ischæmia, no doubt, and death eventually occurs in spite of all efforts to reverse the tide. (4) Moderate to severe degrees of the above may occur but of short duration

and the reaction is reversed spontaneously. We may pride ourselves on our therapeutics, but I have grave doubts that our conceit is well founded. Heberden, in 1765, humbly acknowledged his helplessness, but suggested that opium, spirits and rest were the only possible agents which might help. An ultra honest confession for his time, but we would do well to follow his example and be more sparing of meddlesome therapeutics.

It is interesting to note that vascular accidents in the viscera within the thorax are followed by a train of symptoms not equalled elsewhere in their ferocity, even excepting the brain. This cannot be accounted for primarily by direct pulmonary or cardiac failure except in those cases where one suspects ventricular fibrillation or can demonstrate complete blockage of the pulmonary artery. In these, instant death occurs. In all others the insult seems to create a malign reaction along an unknown pathway. Can it be the nervous system? This is suggested by the experiments where severance of the autonomic bridge from injured viscera mitigates the effects of local trauma. But it does not equally hold for a skeletal injury. It would appear as if there were an essential neurological difference, but this may be more apparent than real. The riddle becomes more complicated!

The imbalance of potassium and sodium are perhaps the most significant biochemical changes. The former may rise to such levels as to cause alarm; but, in the crush syndrome where shock may be surmounted the blood potassium may continue to rise to a unique level until death occurs with anuria or—in the hepato-renal syndrome, a similar termination may occur, with jaundice added.

What do all these variations and similarities within the function of time mean? Perhaps a varying picture retouched by a capricious and Mephistophelian artist! We may be so close to one view that we miss the panorama.

There is throughout a haunting suggestion of adrenal failure. Such a theory would seem to give us hope, but it becomes less substantial as we pursue it to an ultimate analysis. In small animal experiments shock is more readily produced in the adrenalectomized than in the normal. Further, the former can be protected by potent cortical extracts. But when these findings are transferred to man we draw a blank. Can it be that these extracts are not strong enough? They do, however, protect man in the crisis of Addison's disease; therefore, why not in shock? Again missing links are found (*a*) the trigger mechanism, and (*b*) the impotence of the obvious antagonist.

I cannot close without reference to loss of "muscle tonus". This is a very real factor in the maintenance of the peripheral circulation which is controlled by the spinal centres. Therefore, if it plays a rôle, we are taken back to the question "What affects them?" and the answer is the same "We do not know". It might be protested that this could be through peripheral nerve insult, either skeletal or autonomic. But this assumption could be countered by ingenious experiments to prove the contrary. Both sides might have equal protagonists. Again, the use of coramine in animal experiments seems beneficial, but in man its virtue is hard to demonstrate. This theory has much to commend it and should be pursued further with an open mind. The trigger mechanism is at hand if following events can satisfactorily be aligned in a reasonable sequence and their reversal accomplished.

PHYSIOLOGICAL PRINCIPLES IN THE REPAIR OF INGUINAL HERNIA*

The Address in Surgery before the Royal College of Physicians and Surgeons of Canada

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A HALF century has passed since Bassini pubpublished his method of repair of inguinal hernia, and yet we still are far from the ideal. Numerous articles appear annually in the journals, to tell us that recurrences are all too frequent and to suggest how they may be avoided. In a recent discussion of the problem a celebrated London surgeon made the remark that, while there are several surgeons whom he would permit to do a gastric section on him, there are only one or two to whom he would entrust a hernia operation. We are still influenced too much by this or that technique, and too little concerned with selecting our procedure in the light of the anatomical and physiological situation that each case presents.

* Delivered at the thirteenth Annual Meeting, Ottawa, October 24, 1942.

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Although the literature on hernia is vast, it will take but a minute to review its history. In 1890 Bassini,[5] of Padua, taught his classical method of suturing, beneath the cord, the inferior margin of the internal oblique with the mis-called "conjoined tendon", to Poupart's ligament. Three years later Halstead[10] published his method of a somewhat similar approximation of the tissues, but with this variant, that the external oblique was also brought down behind the cord, which remained subcutaneous. Ferguson[8] had been using a technique similar to Halsted's, but his recurrences forced him, in 1899, to alter his method by completely burying the cord behind all sutured tissues.

These three classical procedures, with which we are all familiar, formed the basis for numerous variations. Soon attempts were made to use autogenous tissues for suture or grafting material. In 1895 E. W. Andrews[1] described his "imbrication" method. In 1901 McArthur[16] recommended the employment of strips of fascia derived from the cut margins of the external oblique aponeurosis with which to darn up the weak area. In 1910 Kirschner[14] suggested a transplant of fascia lata to be sutured over the Bassini suture line as a patch. Gallie and Lemesurier,[9] after careful experimental work, developed in 1921 the technique of darning the defect with strips of fascia lata. In 1933 Philip Turner[23] reported using a pedicled flap of the fascia lata as a patch, turned up under Poupart's ligament. Wangensteen[26] introduced a modification of this in 1934, by carrying a somewhat similar flap up in front of Poupart's ligament. Wadhams,[25] in 1935, offered still another manner of utilizing the fascia lata. You will recall that Halstead had suggested the use of a flap of the anterior rectus sheath turned laterally for a similar purpose. Zimmerman[29] has recently recommended the securing of a flap from the lower leaf of the divided external oblique aponeurosis. The enthusiasm for autoplastic material appeared to have reached its acme four years ago when Veal and Baker[24] advised an osteo-periosteal graft from the tibia to be fixed to the pectineal line of the pubes.

Still another procedure has been suggested of performing the repair from the mid-line. The latest advocate of this was A. K. Henry,[12] who wrote as recently as 1936. Last spring Jennings[13] strongly recommended this procedure for indirect hernia.

The testicle and spermatic cord have been completely excised by some surgeons, or the cord has been moved to a new position, such as described in the ingenious operation of McFee.[17]

Finally, the doubts of the surgeor as to the results of his repair in recurrent cases is reflected in the work of Wilmoth[27] who supplements his operation by the injection of tannic acid solution during the operation in order to increase fibroplasia.

Such a multiplicity of techniques, to which additions are still being made, must mean that some essential points still escape our attention and the ideal has still to be reached. Theodore Kocher[15] told us in the early "nineties" that his recurrence rate was 20%. Just recently Max Page[20] published figures from the London Metropolitan Police records which showed 20% of recurrences in indirect hernias and 25% in the direct variety. In our own experience, follow-ups in such a floating population as hernia cases comprise is a very difficult matter, and unless we are very humble our statistics are better than our results. We should review our knowledge of the anatomy and physiology of the inguinal region.

ANATOMICAL FACTORS

The anatomical factors in indirect hernia are so different from those in direct hernia that these conditions ought to be considered as two totally different lesions, having little in common, save for the fact that they occur in the inguinal region.

The first problem is that of the sac. In the oblique variety the sac consists, in 90% of cases, of a preformed peritoneal protrusion. Henry, and also Jennings, have renewed our interest in this structure by their description of the mid-line extraperitoneal approach. Henry demonstrates the fact that the sac has a funnel-shaped cavity proximally before it becomes tubular. Adequate surgery requires complete removal of this sac high up, that is, above the funnel. This is the first essential step. In fact, we find in children and some young adults that this is all that is needed to secure repair. One, however, should be on one's guard to avoid missing other pockets. When the sac is opened, the exploring finger will detect these other protrusions. Sometimes they can be manipulated so that finally they have all been converted into one sac. After it has been ligated, some surgeons transplant the stump. There perhaps is nothing wrong with this step, provided it does

not compromise the function of the surrounding tissues.

The second problem is that of the transversalis fascia. This retaining sheet reaches around the whole peritoneal sac, from the diaphragm to the pelvis, and from the iliopsoas to the rectus in front. Ferguson laid special stress on this endo-abdominal fascia. He directed our attention to it by reminding us how it demonstrates its efficiency in any abdominal incision. There is no bulging of preperitoneal tissues until it has been divided. Moschcowitz[18] again has stressed its importance, and recently both Zimmerman[29] and Fallis[7] have described a technique which utilizes this valuable layer, once the sac has been cared for.

The hernial sac as it protrudes is invested by this fascial sheet, to which the name of infundibuliform or internal spermatic fascia is applied. As the rupture develops, the opening in the fascia is progressively stretched and widened. If there is a widened internal ring present, simple removal of the sac is not enough. We must suture the transversalis fascia snugly about the cord. That adequate closure of this ring is not always secured is proved by the fact that we sometimes find recurrences of oblique hernia. Lt.-Col. Heath[11] of the R.A.M.C. recently described 175 cases of inguinal hernia in soldiers, 18 of whom had had a repair done since the beginning of the war. In 16 of these 18 he discovered a thin-walled sac at the internal ring, apparently due to incomplete removal at the first operation.

In direct hernia there is no sac, but rather a bulging of the posterior wall of the inguinal canal from the deep epigastric vessels medially to the rectus sheath. This is always an acquired lesion, due to increased strain in the area, or to weakening of the fascia. A third important cause is the weakness of the supporting structures. Reference will be made to this later. But, whatever the cause of the bulging may be, the primary factor is stretching of the endo-abdominal fascia. Seldom does the sac need to be opened, because it is not a true sac. The first job must be a tightening of the transversalis fascia, which may be obtained by purse-strings or by oversewing.

Our third step is the additional reinforcement of the posterior wall of the inguinal canal. The classical Bassini operation attempts this by suturing the so-called conjoined tendon down to Poupart's ligament. Sometimes this is efficient, but several arguments have been raised against it. By this procedure we are attempting to unite two structures which ordinarily pull apart. The stitch, then, is unphysiological. The internal oblique pulls laterally to operate the shutter over the internal ring. Poupart's ligament is a somewhat floating structure, fixed only at its two extremities. If there is any tension, the two will pull apart. We have all operated upon recurrences after the Bassini procedure where we have found not the slightest evidence of the former suture. Gallie and Lemesurier and several others have mentioned this fact.

The stitch also does harm by suturing red muscle to white fibrous tissue. Seelig and Chouke,[22] have emphasized the fact that red muscle and fascial tissues do not unite firmly. Our sutures strangle the muscle tissue and cause ischæmic necrosis and weakening of perhaps the half inch margin of the internal oblique muscle included in the grip of the suture. Muscle should not be sutured. Not only does it do no good, but it actually does harm.

In the third place, we must recognize that the conjoined tendon is a very variable structure, as has been pointed out by several, including Cherner,[6] Anson and McVay,[2] and Zieman.[28] Sometimes there is very little fascia. Sometimes the insertion of the internal oblique does not reach down on to the pubes in the normal fashion, but is lost in the rectus sheath some distance up. Now, if it does not come down well we are certain to have an unprotected area immediately above the bone. This was stressed in 1927 by Babcock,[4] and more recently several have again tried to direct our attention to this point. Our axiom must be that we can unite fascia to fascia, provided there is no tension. In this regard we must not be misled by the remarkable relaxation which spinal anæsthesia produces. If tension cannot be avoided, other methods must be employed to guarantee the closure of the medial angle. The homely comparison to a hole in the seat of one's overalls is apt. If the hole is small, we may sew it up. If it is large, it will tear open when we bend over, so we will have to darn it or patch it.

There have been several suggestions for borrowing tissues. Halsted turned down a flap of the rectus sheath. There is no criticism of this, provided two points are observed. There must be no tension, for the pull on Poupart's and the pull of the rectus are opposed to each other.

And, even if there is no tension, there must be every care to reinforce the weak spot just above the os pubis. The fascial repair must be anchored to the stout fibres of Cooper's ligament at the medial angle of the wound out to the femoral vein. Poupart's ligament is of only secondary importance.

McArthur's method of utilizing strips of the external oblique which have been left attached to the pubes can also be used, provided that they are inserted into Cooper's ligament and the iliopectineal line as well as Poupart's, and under requisite tension.

Andrew's imbrication method is utilized with success at times, but we must remind ourselves that we are suturing tissues from different planes, and we are applying tension to structures which are pulling away from each other. Zimmerman's suggestion for using the lower flap of the external oblique is free from this difficulty.

When local tissues of satisfactory strength are not available, we can turn to the fascia lata of the thigh. Gallie's laces are satisfactory when properly inserted, but the skill with which they are employed, as well as the fascia itself, determines the result. Patches of fascia lata, such as Kirschner used, or the pedicled flaps of Turner, Wangensteen and Wadham may be utilized. But the sutures must reach to the rectus sheath, to Cooper's ligament and the iliopectineal line if a recurrence is to be avoided.

These three steps comprise the essential points in hernioplasty. There must be adequate care of all the sacs; there must be adequate repair of the transversalis fascia, both at the internal ring and at the medial angle; there must be adequate anchorage of supplementary fascial support to Cooper's ligament and the iliopectineal line as well as to Poupart's ligament.

SUTURE MATERIAL

Among the more minor points the choice of suture material has been much discussed. Ochsner and Meade[19] use ordinary spool cotton. Some depend upon silk. Babcock[3] and others use wire. If we fully realize that adequate repair is entirely dependent upon firm adhesion between sutured fascial layers we will immediately disabuse our minds of improper conceptions of the function of the suture. We often read that silk excels catgut because there is less reaction. Yet it is a physiological axiom that good healing in a sterile field is dependent upon adequate tissue reaction. There is little to recommend any special choice of material. Statistics can be found to show a similar number of recurrences, no matter what material is used. All that is needful is adequate maintenance of apposition of fascial surfaces until Nature has furnished union.

The possibility of infection is to be considered. Mass ligature and massacre with forceps contribute to an accumulation of serum which serves only as a culture medium. Reference must be made to the reported greater percentage of infection with fascial suture. The contributing factor here is the rather bulky knot which is gradually dissolved by tissue reaction. A little technical care will reward us by reducing the frequency of infection from this source.

There is another factor that can increase the accumulation of serum, and, that is constricting sutures. If these are tied too tightly, they will cause ischæmic necrosis. Mattress sutures are especially dangerous and are perhaps better avoided.

All of these minor points are mere items in surgical technique to which special care is to be given. But the basic problem is to be solved by a consideration of the anatomical and functional factors of the inguinal region. The operation for hernia is not herniotomy nor herniorrhaphy, but a hernioplasty. It demands a rigid adherence to the principles of plastic surgery in any area. Principles must determine procedures. If we observe the following rules, we will come closer to the ideal.

1. High ligature of all sacs.
2. Repair of the transversalis fascia at the internal ring and also at the medial angle above the pubes.
3. Adequate reinforcement by uniting white fibrous tissue to white fibrous tissue, with the interposition of no muscle tissue however.
4. Attention to the unprotected area immediately above the os pubis.
5. Selection of proper sutures, fascial lacing or patching to provide the reinforcement.
6. Adherence to the elementary principles of wound treatment regarding sterile technique, hæmostasis and the introduction of sutures and knots.

REFERENCES

1. ANDREWS, E. W.: *Chicago Med. Rec.*, 1895, **9**: 67.
2. ANSON, B. J. AND MCVAY, C. B.: *Surg., Gyn. & Obst.*, 1938, **66**: 186.
3. BABCOCK, W. W.: *Am. J. Surg.*, 1935, **27**: 67.
4. *Idem*: *Surg., Gyn. & Obst.*, 1927, **45**: 534.
5. BASSINI, E.: *Arch. f. klin. Chir.*, 1890, **40**: 429.

6. CHERNER, M.: *Ann. Surg.*, 1934, **99**: 577.
7. FALLIS, L. G.: *Ann. Surg.*, 1936, **104**: 403.
8. FERGUSON, A. H.: *J. Am. M. Ass.*, 1899, **33**: 6.
9. GALLIE, W. E. AND LEMESURIER, A. B.: *Canad. M. Ass. J.*, 1923, **13**: 469.
10. HALSTED, W. S.: *Johns Hopkins Hosp. Bull.*, 1893, **4**: 17.
11. HEATH, N. *et al.*: *J. R.A.M.C.*, 1942, **6**: 283.
12. HENRY, A. K.: *Proc. Roy. Soc. Med.*, 1937, **30**: 534.
13. JENNINGS, W. K. *et al.*: *Surg., Gyn. & Obst.*, 1942, **74**: 697.
14. KIRSCHNER, M.: *Arch. f. klin. Chir.*, 1910, **92**: 888.
15. KOCHER, T.: *Ann. Surg.*, 1892, **16**: 505.
16. MCARTHUR, L. L.: *J. Am. M. Ass.*, 1901, **37**: 1162.
17. MCFEE, W. F.: *Ann. Surg.*, 1940, **112**: 1071.
18. MOSCHCOWITZ, A. V.: Chapter on Hernia—Operative Therapeusis, Johnson, New York, Appleton, 1915, **4**: 1.
19. OCHSNER, A. AND MEADE, W. H.: *J. Am. M. Ass.*, 1939, **113**: 2230.
20. PAGE, C. M.: *Brit. M. J.*, 1934, **2**: 896.
21. PITZMAN, M.: *Ann. Surg.*, 1921, **74**: 610.
22. SEELIG, M. G. AND CHOUKE, K. S.: *Arch. Surg.*, 1923, **7**: 553.
23. TURNER, P.: *Guy's Hosp. Rep.*, 1933, **83**: 233.
24. VEAL, J. R. AND BAKER, D. D.: *Surgery*, 1938, **3**: 385.
25. WADHAMS, R. P. AND CARABBA, V.: *Ann. Surg.*, 1935, **101**: 1264.
26. WANGENSTEEN, O. H.: *Surg., Gyn. & Obst.*, 1934, **59**: 766.
27. WILMOTH, C. E.: *Surg., Gyn. & Obst.*, 1940, **71**: 802.
28. ZIEMAN, S. A.: *Am. J. Surg.*, 1940, **50**: 17.
29. ZIMMERMAN, L. M.: *Surg., Gyn. & Obst.*, 1938, **66**: 186.

CLINICAL POINTS ON RUPTURED INTERVERTEBRAL DISCS; LOW BACK PAIN AND SCIATICA*

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THE clinical picture caused by protrusion of the lower lumbar intervertebral discs into the intraspinal space is becoming increasingly clear (Bradford and Spurling[1] and McKenzie and Botterell[3]). There are two main components: (1) sciatica, due to pressure on a lower lumbar or upper sacral nerve root; (2) low back pain, due to involvement of the bony or ligamentous vertebral structures. Either of the two may occur alone or both together.

The full picture includes the following: (*a*) onset of back pain, sciatica, or both, following strain or trauma; (*b*) intermittence of symptoms and recurrent bouts of the condition; (*c*) increase of symptoms by extension or lateral rotation of the lumbar spine and by coughing or straining; (*d*) tenderness on stretching or compression of the affected sciatic nerve; (*e*) tenderness on deep pressure over the back lateral to the affected intervertebral disc; (*f*) hypalgesia, hyperalgesia or paræsthesias over the skin area supplied by the affected nerve root (usually S_1 lateral or L_5 medial border of foot); (*g*) diminished or absent ankle jerk; (*h*) increase of spinal fluid proteins or abnormality of air or lipiodol myelograms if such procedures are deemed necessary when the clinical picture is incomplete.

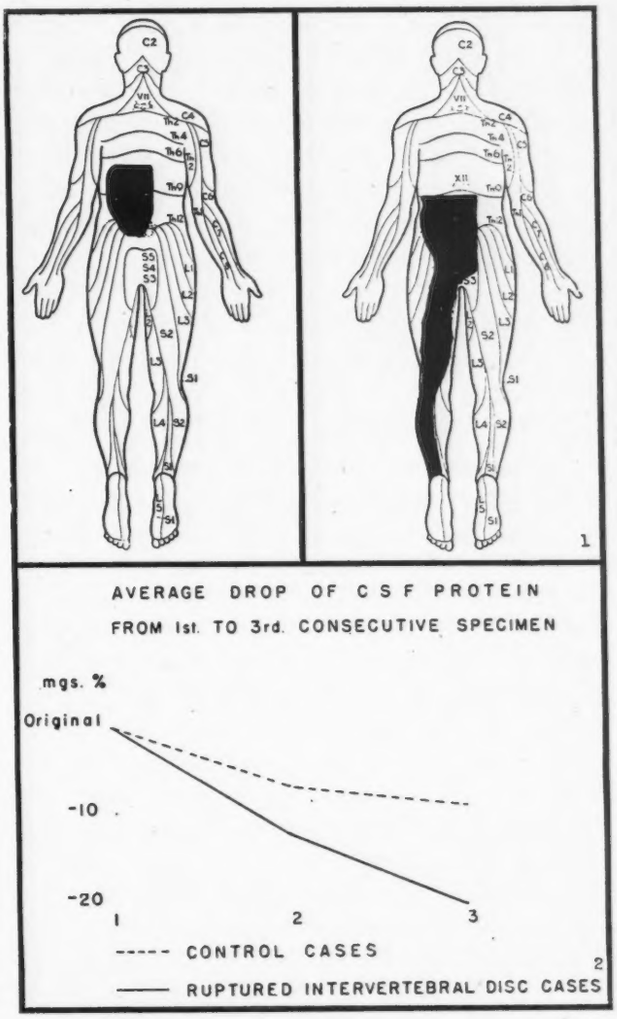

Fig. 1.—Two examples of hyperalgesia associated with ruptured discs.

We wish to emphasize three additional clinical points:

1. *Hyperalgesia over back and loin.*—This has been observed in a number of our cases, but is often absent. It is important, since it constitutes an additional sign of involvement of vertebral structures and should not be interpreted as due to renal or intra-abdominal disease.

When present, the skin over the back on the affected side is unusually sensitive to the prick or stroke of a pin or to rough tactile stimulation. The sensation is described as "spreading", "vibrating", or painful, always as unpleasant and unusual. In this respect it resembles "thalamic" over-response. The responsive area

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ERRATA—Page 34, col. 2, par. 3, line 2 should read "much more intense and there was left sciatic radiation". Page 35, col. 1, par. 4, line 14, the illustration referred to is "Fig. 2".

usually extends from the lower costal margin to the iliac crest behind, and occasionally down on to the buttock or even on to the sacral areas on the back of the thigh and leg. On the back it extends forward only to about the posterior axillary line and does not involve corresponding segmental areas on the anterior abdominal wall. It is therefore not segmental in distribution.

Strong reflex contraction of the posterior spinal or intercostal muscles of the affected side may accompany stimulation of the skin area even when the stimulus is insufficient to cause unpleasant sensation. Two examples of the distribution of hyperalgesia are pictured in Fig. 1.

The phenomenon appears to be referred hyperalgesia and not due to direct root involvement. An explanation may, at some later date, be found in the intersegmental nerve supply of the dura and ligamentous structures.

2. *Pelvic and intra-abdominal reference of "low back" pain.*—The "low back" pain may be severe but so ill-defined that renal, pelvic or intra-abdominal disease is suspected. This is particularly true if sciatica is slight or lacking, and an intraspinal lesion is thus less suspected. The patient may place one hand in front of the iliac crest, the other behind the sacro-iliac joint and say, "The pain is somewhere in here". In one female patient without sciatica a gynæcological examination was obtained because of severe pain of this type. No local pelvic abnormality was found. Months later there was a recurrence of the same pain, but sciatica was superadded and the diagnosis of ruptured intervertebral disc (L_5-S_1) was made. This was confirmed at operation, which resulted in immediate relief of both the "pelvic" pain and the sciatica.

Deep pain and tenderness in the kidney region was so marked in another female patient with severe sciatica that extensive urological investigation was carried out. A ruptured disc (L_5-S_1) was removed at operation and this gave complete relief.

A male patient, while lifting a chesterfield, developed low back pain with radiation into the left groin and testicle. This disappeared after two weeks, but returned about a year later, at which time cystoscopy and other urological investigations were carried out, with negative results. Pain persisted during the following year and was finally recognized as being of intraspinal origin, although there had been no sciatic radiation at any time. There was complete relief of pain after removal of a ruptured disc between L_4 and L_5 on the left side.

It seems possible, indeed, that pain from a ruptured disc may sometimes be referred to the upper abdomen.

One of our patients, a woman of 54, developed low back pain after lifting a heavy weight. There was radiation of pain to the lateral aspect of the left thigh. Grumbling low back pain persisted and to it, after 10 months, there was added dull, aching pain deep between the epigastrium and the back. There were occasional nausea and vomiting when the pain was severe but none of the symptoms was related to food or fasting. Cholecystography and barium enema were negative. A barium series showed apparent deformity of the duodenum, which suggested an old ulcer. Exploratory laparotomy showed the stomach, duodenum and gall bladder to be quite normal.

Six days after laparotomy the low back pain became much more intense and sciatic radiation remained. Examination showed the usual signs of lower lumbar disc rupture with sciatica, absent ankle-jerk and hypalgesia over the lateral border of the foot. In addition, there was hypalgesia on the antero-lateral aspect of the left thigh corresponding to segment L_3. Air and pantopaque myelograms showed two large protrusions between L_3-L_4 and L_4-L_5 respectively. Both protrusions were removed at operation. This resulted in complete relief of both the low back pain and the aching sensation in the epigastrium.

In retrospect the patient feels certain that the epigastric pain was referred from the back. It is noteworthy that one of the ruptures (L_3-L_4) was higher than usual and may have been responsible for the epigastric radiation.

The increasing awareness by the profession of ruptured intervertebral disc is permitting us to see more cases with low back pain in which sciatica is either absent or in the background of the picture. The difficulty which the patient sometimes has in localizing the back pain, and the tendency for it to be referred to the pelvis, kidney region or even the abdomen, makes it necessary for the clinician to consider ruptured intervertebral disc when confronted with unusual or unexplained pain in these regions.

A word should be said concerning the special character of pain associated with ruptured intervertebral disc. The deep, gnawing, ill-defined back pain and its jet-like exacerbation with straining or certain movements may cause rapid depletion of the patient's weight, strength and nerve. The sufferer is eternally tense and on guard lest some untoward movement intensify the pain. This extends even into the night, during which any slackening of vigilance may result in severe pain due to the ordinary turning movements during sleep. The peculiarly harassed attitude of these patients is apt to lead the staff into unjust thoughts of neurosis or drug addiction. The immediate

change of appearance and demeanour when the cause of pain is removed provides the correct answer.

3. *Protein gradient in spinal fluid.*—Elevation of protein in the cerebrospinal fluid drawn from a lumbar space below the level of the ruptured disc is a helpful diagnostic point. This occurs rarely. Puncture should be done low, preferably between L_5 and S_1, in order to tap below the suspected level of the lesion. Increase of protein is apparently due to exudation from the lesion or to a partial subarachnoid block.

Normally the cerebrospinal fluid protein increases from the point of formation of the fluid in the cerebral ventricles to the lumbar sac. The usual figures are: ventricular fluid, 10 mgm. %; cisternal fluid, 20 mgm. %; lumbar fluid, 40 mgm. %. It might be expected that successive samples of fluid drawn from beneath the level of a protruded disc might show relatively high protein content in the first samples, even if later samples flowing down from above the protrusion were normal.

We tested this by determining the protein in three successive samples of 2 c.c. each. Twenty-four cases of lower lumbar disc rupture were studied. All of these were ruptures between L_4 and L_5 or between L_5 and S_1. Site of puncture was usually between L_5 and S_1. Thirty-three cases without evidence of intraspinal disease, but with varying cerebrospinal fluid protein levels (*e.g.*, normal, brain tumours, etc.), were used as controls.* The majority of disc cases showed greater drop of cerebrospinal fluid protein from 1st to 3rd sample than did the control cases, and the average drop was more than twice that of the controls (see Fig. 1). Eaton[2] did not find this difference.

Despite the changes shown in our cases we feel that the results are too scattered to serve as a useful clinical tool in the diagnosis of ruptured discs.

SUMMARY

Attention is drawn to pelvic or abdominal reference of back pain associated with rupture of the lower lumbar intervertebral discs. When sciatica is not present the pain may be wrongly attributed to visceral disease and its origin in the vertebral structures may not be suspected. The pain is apt to suggest disease of the female pelvic organs or of the kidney and ureter.

Areas of hyperalgesia of the skin of the back occur in some cases of ruptured disc. The character of this hyperalgesia is described.

Total proteins have been estimated in serial samples of cerebrospinal fluid withdrawn from below the protrusion in cases of ruptured disc. There was a greater drop of protein from first to third sample than in control cases but the results were too scattered to permit the use of this method as a reliable clinical tool.

* Miss Beth Gourley compiled the figures.

REFERENCES

1. BRADFORD, F. K. AND SPURLING, R. G.: The Intervertebral Disc, C. C. Thomas, Springfield, Ill., 1941.
2. EATON, L. M.: Comparison of protein content of first and second portions of cerebrospinal fluid removed at lumbar puncture, *Proc. Staff Meet. Mayo Clin.*, 1939, 14: 661.
3. MCKENZIE, K. G. AND BOTTERELL, E. H.: The common neurological syndromes produced by pressure from extrusion of an intervertebral disc, *Canad. M. Ass. J.*, 1942, 46: 424.

RÉSUMÉ

Le syndrôme de la hernie du disque intervertébral est bien connu. Trois nouveaux signes cliniques sont décrits: 1. L'hyperalgésie du dos et des lombes avec ou sans sciatique: douleur irradiante, vibratoire, inusitée et très désagréable, elle n'atteint pas la paroi abdominale. Elle serait d'origine dure-mérienne ou lugamenteuse. 2. La douleur à distance avec participation abdominale ou pelvienne. Lorsque la sciatique n'est pas présente, cette douleur peut être attribuée aux organes du bassin, à l'appareil rénal, parfois à l'abdomen supérieur. 3. La diminution progressive de l'albuminorachie dans le l.c.r. recueilli plus bas que la hernie du disque à 3 ponctions faites à intervalles égaux.

JEAN SAUCIER

THE TREATMENT OF PLANTAR WARTS*

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ETIOLOGY

WE know that in keratoderma a congenital anomaly interferes with the process of normal keratinization. We know too that in corns and calluses the increased activity in the lower part of the rete and in the basal-cell layer, characterized by acanthosis and particularly hyperkeratosis, is a protective reaction to traumatism. But in plantar warts the cellular hyperplasia has an unknown etiology. Nevertheless, because they are inoculable, and self-

* Paper read at the mid-winter session of the Canadian Association of Radiologists, Hamilton, Ont., January, 1943.

inoculable, plantar warts could be regarded as due to micro-organisms.

PATHOGENESIS

The irritation of the skin by a causal agent stimulates a hyperplasia of the Malpighi cells; afterwards all the epidermal layers become hypertrophied and dermic papillæ grow longer and bud.

So, in the verruca plantaris keratosis and papillomatosis are important, and it is because irradiation curbs mitosis of the hyperplastic cells and makes the horny layer of the hyperkeratosis exfoliate, that the results of roentgen therapy in this condition are so good.

TREATMENT

We bring nothing new on this matter. We only intend to discuss the advantages and disadvantages of the different usual methods of treatment for plantar warts.

Many therapeutic methods have been proposed to cure plantar warts. The most important for us are, surgery, negative electrolysis, diathermocoagulation, electrodesiccation, fulguration, cryotherapy, radium therapy, and roentgen therapy.

Surgery.—For a long time, all the plantar warts recalcitrant to older methods had to be dealt with surgically. This treatment necessitates a local anæsthetic and immobilizes the patient with a dressing for many weeks. Sometimes it leaves a disagreeable scar. This method will probably be abandoned by all dermatologists.

Negative electrolysis. — The introduction of the needle—connected to the negative pole of galvanic current machine — between wart and normal skin, can give very good results. Treated with an intensity of one to three milliampères, during a few seconds, warts shrink down eight to ten days later, leaving but a very slight scar. This method, like surgery, cannot be applied without local anæsthesia and there is subsequent discomfort in walking.

Electrolysis is considered as an exceptional method.

Diathermocoagulation.—A needle introduced into the wart, and left there as long as the high frequency current illuminates the wart, constitutes an excellent method of treatment. But this treatment must be applied under local anæsthesia, and sometimes inconveniences the patient for several days. We prefer this method to electrolysis each time the warts fail to respond to radiation, because it is more rapid and easier than electrolysis. Moreover, it is less inconvenient for the patient during the following days. Still, just as with electrolysis, it is an exceptional method of treating plantar warts.

Electrodesiccation.—For small warts the unipolar application of the high frequency current could be used; because its action is a drying-out or dehydration of the tissue, it is rather circumscribed. It is less inconvenient than diathermocoagulation, but for us it is still an exceptional method.

Fulguration.—This is a burning and destruction of superficial tissue by a fine spark. It seems to be more unreliable than the high frequency applications, and has the same disadvantages.

Cryotherapy or carbonic snow treatment.—This method gives good results in many cases. A pressure of one and half kilograms during 30 seconds, produces a phlyctæna below the wart, allowing us to remove this hyperproduction two or three days later. However, this treatment is rather painful and unreliable and consequently is seldom used.

Radium therapy.—The first publication on the treatment of plantar warts with radium dates back to 1912, in Wickham and Degrais' book. The radium therapy with a small flat Ra applicator, administered in the dose of one-quarter to one-half millicurie per square centimetre according to the thickness of the lesion is an efficacious therapeutic method. MacKee reported many cases successfully treated by radium. At the Radium Institute of Montreal, we have treated but a few cases of plantar warts with radium and have had the same results as with roentgen therapy. But we must not forget that this therapy requires a special material, not in the hands of all the radiologists or the dermatologists. Moreover, it is a too expensive treatment for a lesion that can be successfully treated by cheaper methods. I see no special reason to treat plantar warts by radium when superficial x-ray therapy in the hands of the radiologists give as good results.

Roentgen therapy.—Roentgen therapy is unquestionably the method of election for the treatment of plantar warts.

Belot and MacKee treated hundreds of cases with x-rays since 1915. With a few exceptions, these cases were treated with unfiltered radiation. Belot, followed by many French authors, used to irradiate plantar warts with a tension of 120 kv, without filtration or sometimes with

0.5 mm. Al. To avoid unpleasant reactions in the surrounding tissue, he makes an opening in a lead shield that must fit the lesion exactly. He used to administer 1,300r to 1,400r units (measured at the surface of the skin) in a single dose of unfiltered radiation. After fifteen days a deep erythema appears followed by a subsidence and a disappearance of the wart about the thirtieth day. If the disappearance is not complete, then he administers a second dose of 800r with a filtration of 0.5 mm. Al.

Wise, Hazen and Eichenlaub and Michael administer smaller doses than Belot does. They deliver 450 to 750r of unfiltered radiations at intervals of one month. They have successfully treated many cases without recurrences. Their results seem to be as good as those of Belot with a less unpleasant reaction.

MacKee at the New York Post-Graduate Hospital delivers usually a dose of only 300r of unfiltrated radiation. Occasionally he delivers 450 to 600r units in a single dose. His results seem not to be so good as those of the preceding authors because they are only 50% instead of over 75%.

Personally, we started more than thirteen years ago, to use Belot's technique. But the reaction was so serious that we looked for modifications of that technique. On the one hand we diminished the dose from 1,300 to 900r and finally to 600 to 800r according to the thickness of the wart. On the other hand, to use our dose at the maximum, that means to deliver more radiation to the basal layer of the wart, for the same dose at the superficial layer of the surrounding normal skin, we homogenized our x-ray beam with a filtration of 2 to 5 mm. of Al. under a tension of 120 kv. We observed that with a slighter x-ray reaction our results were as good as Belot's and better than those of many other authors. Of 38 cases which we treated by a single moderately intensive dose of filtered radiation, 31 (81.5%) were cured for the most part after one, or sometimes after two doses, at intervals of one month. The 7 cases not cured by roentgen therapy, were all cured by diathermocoagulation.

Contact therapy.—Although we have treated only three cases of plantar warts by contact therapy, we wonder if that method will not be regarded in the very near future as the treatment of election for plantar warts. At a distance of 2 cm., with a filtration of 1 mm. Al. we administered a single dose of 700 to 900r. Our three cases were cured by a single dose with a slight reaction.

MANAGEMENT

The management of our treatment is sketched in the five following points:

1. All the plantar warts should be at first treated with a single intensive dose of filtered x-rays.

2. If the lesions are multiple they should be separately treated, starting with the first one (that means the mother wart), for sometimes all the other warts disappear at the same time as the mother wart.

3. If the lesions are inflamed it is advisable to postpone the treatment for a week or two, to give them time for subsiding.

4. If the lesions do not disappear as a result of one or two intensive doses at interval of one month, the treatment must not be continued because a radiodermatitis could occur.

5. When the plantar warts fail to respond to roentgen therapy we employ negative electrolysis, diathermocoagulation, electrodesiccation, fulguration or cryotherapy to destroy these lesions, but diathermocoagulation seems to be the more reliable and convenient method.

CONCLUSIONS

Roentgen therapy is the method of election for plantar warts, while all other methods are exceptional.

Because the too large unfiltered doses administered by many French authors give a serious reaction, and because the too small unfiltered doses administered by many American authors give many recurrences, we suggest the use of medium doses filtered by aluminium for the treatment of plantar warts as being without unpleasant reaction and, regularly, without recurrences.

In the three years following the last war more people died from famine and preventable disease than were killed in the war itself, hence the importance attached to the present organization of post-war relief. Dr. Meville Mackenzie, principal regional medical officer, Ministry of Health, holds that the lives and health of millions in Europe as well as the physique and welfare of a generation to come depend on how well this preparatory work is done. He visualizes four principal problems: the provision of food, the supply of medical necessities, the control of such diseases as typhus, malaria, tuberculosis, and dysentery, and the re-establishment of the medical, hospital, and public health services in each country. Dr. Mackenzie himself is chairman of the medical advisory committee of the Inter-Allied Committee for Post-War Requirements: on this committee are representatives of 11 different countries including the United States.—*J. Roy. Inst. of Hyg. & Pub. Health*, 1943, **6**: 57.

A SURVEY OF A SERIES OF HAY FEVER CASES TREATED IN 1942*

By R. F. Hughes, B.A., M.D., F.A.C.A.

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HAY fever is a manifestation of allergy which is especially common and troublesome in this area of Ontario. In fact Hamilton has the doubtful distinction of being within the area of maximum pollen production of the types most commonly implicated in the condition.

The 1942 season was one of average intensity of pollen production. Pollen slides were exposed daily from April 1 to September 30 on the fifth floor of the Medical Arts Building in downtown Hamilton, at the height of about 48 feet above the ground, approximately 398 feet above sea-level. The slides were coated with vaseline and exposed for twenty-four hours, from 9 a.m. Counts were made counting five times across the slide with No. 4 ocular and No. 3 objective (magnification X 62).

The pollens were identified and recorded, as were fungus spores, as far as possible.

Charts made from these records show that maple and elm were the first pollens to appear, followed by birch and pine. Pollination was stopped by a snow storm for four days from April 9. By the beginning of May many varieties of tree pollen were present. Grass pollen appeared a week later, remained on the slides until the middle of July, while tree pollen gradually declined and disappeared by the beginning of June. From the middle of July until about a month later practically no pollen was seen. Ragweed pollen began to appear about August 9 and until September 27 dominated the slides. Each of these seasons was marked by symptoms in susceptible patients.

TREATMENT

Treatment of hay fever must be carried out before the pollen season comes on. This means that it must be started a number of weeks in advance of the expected date of pollination, so that the injection of ascending doses of the antigen will produce a tolerance sufficient to protect the patient from the effects of the inhalation of the pollen. Diagnosis is made by dermal or intradermal skin testing with the pollens which are prevalent at the time of symptoms. Conscientious work also requires testing with other pollens, air-borne fungus spores, and inhalants, such as dust, epidermal dust, and household allergens, and even at times with foods as well.

Extracts. — Extracts used are prepared by defatting pollen with ether and extracting with buffered dextrose solution in proportion of three grams dry weight of pollen to 100 c.c. of solution. Extraction is carried on for twenty-four hours in the refrigerator, following which the extract is decanted, filtered through filter paper, and sterilized by Seitz filtration. Its potency is determined by an estimation of the protein nitrogen (0.1 mgm. per c.c. = 10,000 units). This concentrated extract is diluted with buffered dextrose solution to strengths of 20,000 units, 10,000 units, 1,000 units, 100 units, and 10 units for convenience of administration. In the average course of treatment dosage ranges from 10 units in the initial dose, with increases of 50 to 75%, to a maximum of 6,000 to 10,000 units, in from fifteen to twenty treatments; the maximum dose being reached at about the date of onset of pollination. Treatment is continued after a decrease of about 50 to 75%, throughout the season. Where more than one pollen in the same seasonal group is required, a mixture is made and the treatment is carried on in the same way. If sensitivities such as grass and ragweed must be treated the former is begun at the proper time, and the latter introduced later, as the maximum dose must be reached at different times, and the extracts are not mixed. Where non-pollen sensitivities must be treated two or more separate schedules are also maintained throughout treatment.

Preseasonal treatment. — For preseasonal treatment injections are given at intervals of four to seven days, using increasing doses of the required pollen extract or mixture of extracts. The level of treatment reached varies widely, depending on the material used, the sensitivity of the patient and the technique of treatment.

Those plants which pollinate in the greatest abundance and which have the most toxic pollen, *e.g.*, ragweed, require the greatest amount of treatment as a rule. It is not uncommon to reach levels of 15,000 to 20,000 units in the ragweed-sensitive patients, while 1,500 to 2,000 units would be sufficient to control the symptoms in a grass-sensitive patient, and even less in a tree-sensitive patient. Then again, one ragweed-sensitive patient might tolerate 20,000

* Read before the Hamilton Academy of Medicine at Hamilton, April 14, 1943.

GRAPH of POLLEN. HAMILTON, ONT. 1942

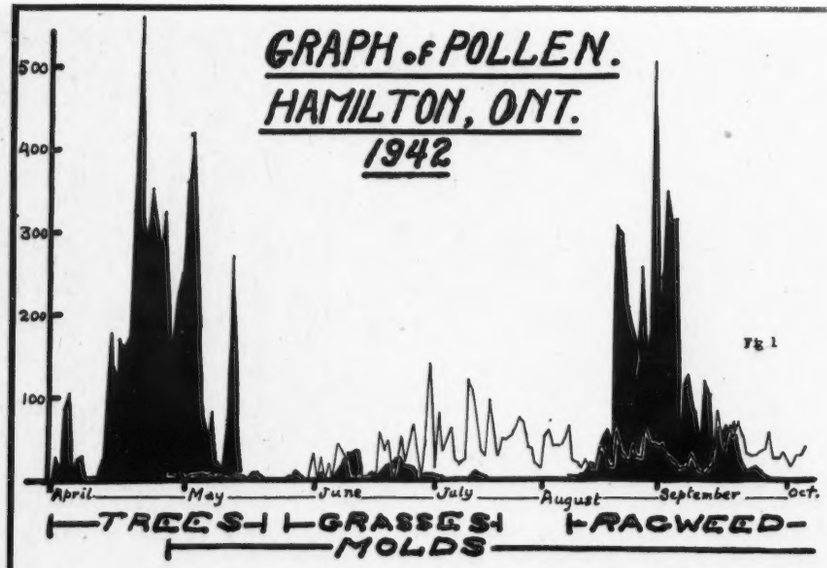

Fig. 1

AGE of PATIENTS.

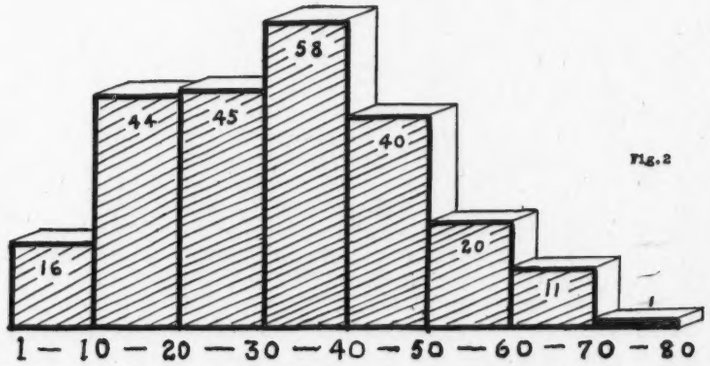

Fig. 2

AGE of ONSET.

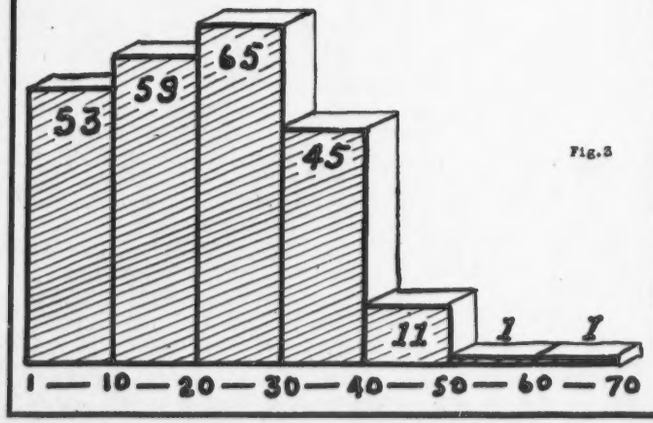

Fig. 3

ASTHMATIC COMPLICATIONS.

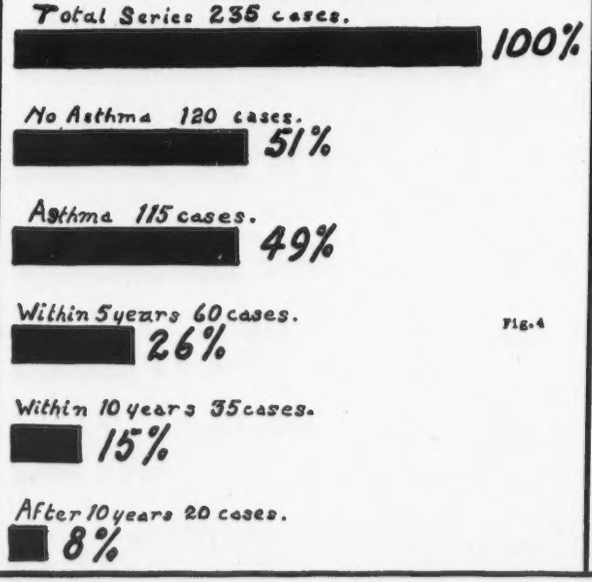

Fig. 4

RESULTS of TREATMENT.

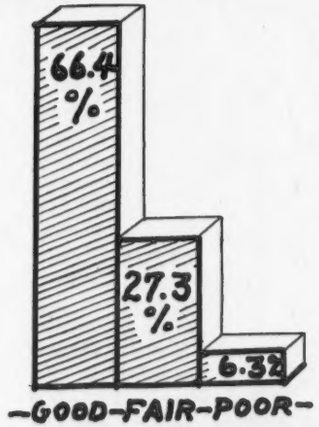

Fig. 5

GOOD — 75 — 100% relief.
FAIR — 50 - 75% relief.
POOR — below 50% relief.

units in a dose, while another might tolerate only 2,000 units, but receive adequate protection. Experiments have shown that by using extracts which are slowly absorbed it is possible to give larger doses than would be possible with the saline extracts in common use.

Coseasonal treatment.—Coseasonal treatment is applied in patients who present themselves after symptoms have commenced, or when the time is too short for adequate preseasonal hyposensitization. Injections are given daily at first, and later at somewhat longer intervals. The injections may be either intradermal or subcutaneous, and doses are much smaller than with preseasonal treatment, ranging from 1 to 10 units at first and increasing very little beyond this, no attempt being made to reach high dosage. While this is not as satisfactory as preseasonal treatment, in most cases it does give considerable relief, and in combination with symptomatic management enables one to carry the patient through the season without his experiencing the degree of distress which would otherwise be unavoidable.

Perennial treatment.—Perennial treatment is a means of maintaining tolerance between one season and the next by injections at intervals of two to four weeks. The dosage is fairly large, being in the neighbourhood of one-half the maximum preseasonal dose, and this may be gradually increased until it equals or exceeds the previous maximum by the time the next pollen season arrives. Obviously, it cannot be undertaken until at least one course of preseasonal treatment has been accomplished. It is more convenient, both for the patient and for the doctor, and usually gives somewhat better results than preseasonal treatment.

Analysis of Cases

During the summer of 1942 records were kept on 235 patients who presented themselves for the treatment of hay fever. These included some whose symptoms were associated with the inhalation of pollens from trees, grasses, and weeds (principally ragweed) as well as concomitant inhalant allergens. Of the total, 75 cases were returned to the referring doctors, with the appropriate material for treatment, but their records have been traced and recorded, with those treated by myself.

This does not necessarily indicate an increased sex incidence in the female, as it is possible that females are more prone to seek relief than males for the same condition.

Table I.

Sex Incidence

	Cases	*Percentage*
Female	135	57.5
Male	100	42.5

Etiology

Table II.

Etiology

	Cases	*Percentage*
Total	235	
Number of patients allergic to—		
Ragweed	209	80.9
Grasses	72	30.1
Trees	15	0.6
Other inhalants	85	36.2
Moulds	31	11.1

(Owing to plurisensitivity in many cases the total figures add to more than the number of patients.)

The ages of patients at the time of treatment are shown in Fig. 2.

Almost 80% were between 20 to 50. However, it is interesting to see that 16, or 7%, were 10 years of age or under.

Ages of patients at the onset of symptoms are shown in Fig. 3.

It is more interesting, however, to note that 53, or over 22%, had their onset before the age of 10 years, and almost 50% before the age of 20.

Method of Treatment

After diagnosis by history and skin tests, the cases were treated as previously described. If sufficient time was available preseasonal treatment was given, otherwise coseasonal treatment was used. In cases which had previously had preseasonal treatment this was continued in perennial treatment.

Table III.

Method of Treatment

	Cases	*Percentage*
All cases treated	235	
Preseasonal	188	80.0
Coseasonal	27	11.6
Perennial	40	17.0

Owing to plurisensitivity, some cases were treated by more than one method, *e.g.*, coseasonal treatment, trees or grass, preseasonal ragweed. This accounts for percentage figures adding to more than 100.

Complications

Many laymen, and professional men as well, regard hay fever as a trivial complaint; some even adhere to the old idea that allergic patients in general are suspiciously like psychoneurotics. From this attitude there is a tendency to make light of hay fever, and to prescribe

holidays or nose drops for relief. In fact, the hay fever sufferer has had so little benefit from professional advice that he has given up seeking it. The multitude of remedies advertised and sold is evidence of this fact. One might formulate a law: the status of treatment for any given disease varies inversely with the number of remedies available.

Hay fever is not the harmless annoyance that we are prone to think it. It leads to loss of time which in these days of war is an important consideration. As a criterion of its seriousness one might cite the opinion of the Army Examining Boards, which take a very unfavourable view of it, especially when attended by complications. Complications are in fact frequent, the chief of these being para-nasal sinus infection and asthma. The incidence of asthma in the present series is shown in Table IV.

TABLE IV.
ASTHMATIC COMPLICATIONS

	Cases	*Percentage*
Asthma before the onset of hay fever .	8	
Asthma within 1 to 5 years after onset of hay fever	60	26.5
Asthma within 1 to 10 years after onset of hay fever	95	40.4
Total asthmatic complications	115	48.9

These figures indicate that the hay fever sufferer has at least a 50-50 chance of becoming asthmatic. Clinical observations have shown that many of these patients progress in a few years from seasonal to postseasonal and perennial asthma. Treatment which controls the hay fever symptoms may confidently be expected to prevent the development of this distressing complication (Fig. 4).

REACTIONS

As is well known there is some risk of reactions occurring in the course of treatment. Some of these seem to be unavoidable, while others can be kept to a minimum by careful attention to the technique of the pollen therapy. The principal causes of reactions are as follows: (*a*) accidental injection into a blood vessel, which allows the dose to be rapidly taken up by the circulation, and brought to the shock organs in excessive amounts. Reactions from this cause occur within minutes, or even seconds, of the injection, and are the most severe type. The patient complains of dyspnœa, discomfort and urticaria, which may be both superficial and internal. In other words, the allergic reaction in the form of urticarial swellings involves the skin, the mucous linings of the upper and lower respiratory tracts, and, at times, the gastro-intestinal tract. The symptoms are intense itching and urticarial swelling over large areas of the body, swelling of the mouth, asthmatic breathing, vomiting, and diarrhœa. The shock may be so great that death from asphyxia may ensue. Fortunately, this is very rare, and this type of reaction may be avoided by tugging on the plunger before injection of the dose, in order to make sure that the needle is not in a vein.

(*b*) Another cause of reaction is error in dosage. This is due to carelessness, through use of a wrong vial, or an incorrect estimate of the dose, if taken from the correct vial. Such reactions are usually of the same general nature as the preceding, but are milder in degree, and come on after an interval of 15 to 30 minutes or longer. Both of these reactions are called constitutional reactions, since they involve many systems. They are treated by epinephrine, which should always be ready for instant use when injections of allergen extracts are being given. A tourniquet should be applied above the site of the injection of the extract, to delay its further absorption, while epinephrine is injected in the opposite arm. The dose should be from 0.5 to 1 c.c. depending on the urgency. Care must be taken here also to avoid intravenous injection. The repeated injection of adrenalin is often required, since the effect of the first dose wears off, and the symptoms tend to return.

Systemic reactions occur, and are due to the mistaken injection of excessive doses of allergen. This may be due to the same causes as the above, or may be due to the fact that the patient's tolerance has been reached and exceeded in the course of a series of treatments. Sometimes this occurs if too long an interval is allowed to elapse between treatments. The symptoms usually seen are confined to one system, the upper or lower respiratory tract, or skin, and develop after a long interval. They may require epinephrine, although usually ephedrine is sufficient for their control.

Local reactions, namely, urticaria or inflammatory œdema after an injection, are not infrequent and as a rule do not require treatment, although it is possible to ease the discomfort by the application of cold compresses to the area.

After a local reaction it is usual to repeat the same dose, rather than to give the next higher dose; this usually allows the body to gain tolerance so that the schedule may be resumed. A

systemic reaction calls for a descent of one or more grades on the schedule and possible fractional increases past the danger point. Sometimes it is not possible to pass the point, which becomes the maximum attainable. The occurrence of a constitutional reaction always calls for a searching study of the technique, and it is as well to do it for yourself, before it becomes necessary for the coroner to do so. Constitutional reactions should not necessarily mean the termination of the treatment, but should certainly call for revision of the schedule, if at fault, and exceptional care in the future handling of the patient. The advent of a constitutional reaction does not apparently negate the treatment; indeed it is sometimes found that the "mass hyposensitization" which occurs gives unusually good results so far as freedom from hay fever is concerned; nevertheless it is not recommended as a shortcut to desensitization.

TABLE V.
INCIDENCE OF REACTION

			Percentage
Total patients	235		100
Local reactions	44	patients	18.72
Systemic reactions	53	patients	22.56
Constitutional reactions	4	patients	1.70
Total treatments	2,576	injections	100
Local reactions	92	cases	3.57
Systemic reactions	96	cases	3.73
Constitutional reactions	6	cases	0.23

Four patients had constitutional reactions, two of them having two such reactions each. Fortunately none of these were of the immediate type, but occurred within 15 to 30 minutes of the injection, and were treated by epinephrine, aromatic spirits of ammonia, and ephedrine. None required more than a single dose of epinephrine, and all recovered within twelve hours. It is notable that all occurred on hot humid days in mid-summer, a factor which has struck me as being relevant. Possibly the peripheral circulation took up the allergen more rapidly than usual. It is for protection against such accidents, that it is advisable to have patients wait in the office for some time after receiving treatment. If a reaction should come on after half an hour, it is not likely to be as severe as one coming on earlier.

RESULTS OF TREATMENT

In recommending treatment for hay fever, the doctor is always asked what can be expected from the treatment. In the first place, one must emphasize the fact that hay fever treatment is not offered as a cure for the disease. The allergic mechanism is an antigen-antibody reaction, and while it is possible to immunize a subject against an antigen, no reliable means has yet been evolved for removing the antibody when it has been produced. The allergic antibody, whether natural or acquired, will remain in the system indefinitely, as can be demonstrated by appropriate tests. Even in those persons who have had natural complete remission of symptoms, either spontaneously or following treatment, skin tests will still show positive skin reactions to the antigens which previously caused symptoms. The explanation is that either increased tolerance for the antigen has raised the threshold of reaction, or that treatment has induced the production of another antibody, called a blocking antibody, which prevents the union of antigen with the allergic antibody, which brings about the symptoms.

Treatment if successful will give the patient freedom from symptoms, during the time this blockage is evident, but as it does not usually remain long in evidence, symptoms will recur in the next season, unless the treatment is repeated or maintained by the perennial method. There is some evidence that thorough treatment for a period of five or more years, may bring about a remission for some years, if not permanently. However, the factors concerned are so variable that it is not wise to promise too much.

On the basis of usual expectations, one may say that in the average case, if the causal pollen or pollens and other allergens have been included, and sufficient material has been used, which may vary considerably from case to case, and complete co-operation has been obtained, one should be able to promise relief in 80 to 90% of cases or better. Only a small proportion of cases appears to be resistant to treatment, and even in these, results may be improved if treatment is continued for more than one year. One may confidently expect that complications such as asthma will be reduced and held in check by specific treatment, if at all successful.

In the series reported, an attempt was made to obtain the patient's own estimate of the degree of relief obtained. "Satisfactory results", as reported by a patient, of course may not always have the same connotation. One patient may be satisfied if he has only one week in bed with asthma instead of his usual three or four weeks; another may not be "satisfied"

unless he is absolutely free of all symptoms. One patient jestingly reported that he wanted some of his money back, as he was only 97% improved. Taking into consideration the personal element, I have tried to place the results in their proper categories, by grouping them into *good,* or 75 to 100% improved; *fair,* or 50 to 75%; which I feel is setting a fairly high standard. Those who had less than 50% results are classed as *poor.* Even in this group some patients were not ungrateful for the small measure of results obtained, although they were not given as much relief as one would like to have given.

TABLE VI.
RESULTS OF TREATMENT

	Cases	*Percentage*
Total	235	
Satisfactory results	156	66.4
Fair results	64	27.3
Poor results	15	6.3

CONCLUSIONS

Hay fever is a common condition for which specific treatment is available.

The adequate treatment of hay fever requires careful diagnostic studies and careful treatment by the proper use of specific allergens.

When this has been done, the treatment is reasonably certain of results, and is not attended by great danger of reactions.

Treatment as described is of aid in preventing the development of complications, especially asthma.

Owing to the nature of the immunological processes involved the results obtained should not be considered as cures, but rather as measures of relief.

ANOREXIA*

By Gordon E. Swallow, M.D.

Edmonton

ONE of the most common complaints from mothers is: "My child won't eat", as she brings her 2 to 6 year old child to my office. Also, in school work underweight and under nourishment are the defects most frequently reported from the physical examinations.

Kugelmass[1] remarks: "What elements of nutrition fulfil the needs of the child for optimum growth and development? At least 50 simple chemical substances. Other identified nutrients exist that are probably indispensable. Food for the child must supply proteins of a character to furnish the 22 amino-acids essential for the construction of body protein; dextrose in abundance to be used by cells as a direct source of energy; linoleic acid from lipids for structure of protoplasm; 12 vitamins for regulations of body function; 12 inorganic elements in appropriate combinations; and water and oxygen for metabolic purposes. This adds up to 50 nutrient substances which must be derived from dietary and other sources in adequate amounts for uninterrupted growth, development and health throughout prenatal and postnatal life."

Those 50 nutrient substances in the vast majority of cases are not being supplied. At Edmonton in 1939 a dietary survey was carried out by G. Hunter and L. B. Pett.[2] In this the diet of 76 families comprising 323 persons was investigated. This included families of ordinary income. The primary object of the survey was to obtain an accurate record of the food consumed at each meal by each individual in the family over a seven-day period. From the recorded foods taken by each was calculated the average daily caloric consumption, the average daily protein consumption, the average daily fat consumption; also the calcium, iron and vitamin A, B_1, and C intake. The findings were as follows:

Calories.—Of the whole group 44% had diets adequate in calories, 47% deficient in calories; and 9% grossly deficient in calories. The last group was composed mostly of women and children. *Protein.*—Of the whole group 38% had diets adequate in protein; 50% had diets deficient in protein and 12% diets grossly deficient in protein. Of the last group 82% were mothers and children. *Fat.*—Of the whole group 55% had diets adequate in fat; 33% diets deficient in fats; and 12% grossly deficient in fats. The group surveyed was more adequately supplied with fats than with any other item. *Calcium.*—Seventy-four per cent of the children under 6 years had diets deficient in calcium. *Iron.*—In only one of the 76 families did all members have diets adequate in iron. Serious iron deficiency is on a par with serious calcium deficiency. Nearly 90% of those grossly deficient in iron were women and children. *Vitamin A.*—The children were fairly supplied with this

* Read at the Seventy-third Annual Meeting of the Canadian Medical Association, Jasper Park, Alta., June, 1942.

vitamin, but the adults' intake left much to be desired. *Vitamin B_1.*—Seventy-three per cent of all children up to 6 years had diets deficient in vitamin B_1, and over 90% of all other age groups according to present standards, vitamin B_1 deficiency is widespread and serious in degree. *Vitamin C.*—The findings with regard to vitamin C are more favourable than B_1 but less favourable than A. As found in the other constituents, women are less adequately supplied with the vitamins than men.

Our results indicate that diet tends to improve automatically with increase of income. It is, however, a slow process. The only means left to maintain the health of the population in so far as adequate diets are concerned is to teach people to make the most of their available money. With some sacrifice in variety the degree of adequacy attained in a few of our poorer families is astonishing.

Now, if we are going to attain the object of better nourishment we must begin early and establish better food habits in children and at an earlier age. They must be induced to like and take a wider range of food, a more abundant diet. How can this be done? The basis of all feeding is hunger. There is no difficulty in feeding a hungry child. Babies begin on mother's milk or a formula containing cow's milk. At 3 months cereal may be introduced; at 5 months, egg yolk and milk puddings; at 6 months, fruits and vegetables, so that, before the year is over, all cereals, milk puddings, fruits and most vegetables are given and meats introduced at 1 year.

During the first year hunger and the rapid growth have been working and appetite has been stimulated. The baby will eat, just give him the chance. During the second year the rate of growth slows down and up to the sixth continues to slow down, and I find that here is the hardest time to get mothers to understand that they must slow down too. They still want to stuff their child; they still love to have fat babies, not understanding that nature only expects an infant to put on about 6 pounds in the whole of the 2nd year, and less each year up to the 6th year, when 2½ to 3 pounds is all that should be expected.

The newly born may be fed 6 and 7 times in 24 hours; he is growing fast. At 3 months he can go to 5 times. At 7 to 8 months, to 4 times daily, three meals and an extra bottle of milk; at 15 months to 3 meals daily, and at 2 years he could easily go to 2½ meals in 24 hours, and he will do better on 2½ meals than on the 4, 5, 6, and even 8 meals that some mothers still try to get in. Where does hunger come in when there is no chance for hunger? What happens to a good appetite when coaxing, bribing, cajoling, and deception is used to get an extra mouthful? Let the child become hungry and he will eat.

What a child takes when he is hungry he will like, he will digest it; his body is asking for it, and the next time he gets it his subconscious mind will tell him that it is all right and he will like it again. And the reverse is just as true. What a child takes when he is not hungry, what is forced upon him or cajoled into him he will not like it then, will probably not digest it well and the next time he sees it his subconscious mind again comes into play and revulsion and rebellion are manifest. To continue that path can only lead to further trouble. Right there is born the basis for anorexia throughout childhood.

Food fads and slogans come into play also. Have you ever heard these "A quart of milk a day for every child", "An apple a day keeps the doctor away", "You must drink up your orange juice", "Warm cocoa is good for you", "I give my child an egg a day, the doctor says so"? Let me speak of those foods. All of them are good foods but so often overdone that many children will not take them at all.

Milk might be called the basic food of infant, child and adolescent. Although a good food it is not a complete food, lacking such minerals as iron, copper, iodine, etc. I do not know who started the slogan, "A quart of milk for every child", but it is a very common one and often used by members of our profession. But this I do know, that if that is carried out to the letter there will be a large portion of malnourished children. There is a definite condition, called for want of a better name, milk-fed injury, caused by giving too much milk over too long a period of time. In all my books on nutrition, and I must have about 15 by different authors, of various nations, there is only one which says to give a child a quart of milk a day and the author of that is an American, and the American quart is 8 ounces less than ours. It is in trying to cram down that extra 8 ounces and more that injury is done. Given, or made to take that much milk, the child will not want,

from sheer lack of appetite, to take other just as necessary foods.

Having said that, let me make my position clear as to milk's place in the dietary. It is a good food; probably as nearly a complete food as we have, and I should not like to try to raise a child without it. Also experimental work has shown that, besides its own food value, it helps by the correct intestinal flora which it creates to assist in the digestion of other foods. To put it another way; other foods are more completely digested when milk is included in the diet.

Many feeding experiments carried out with animals and chickens show that those getting milk with their other foods, grow faster and are much better conditioned than the control animals, on the same food, but getting no milk. You can raise a dog, a chicken, or a pig in 6 months, but it takes 15 years to raise a child. Milk is needed over that period of life. How much? Older children may take 1½ pints, but no quarts of milk to the younger child, I beg of you.

Eggs too are often overdone in feeding. A child will actually take more eggs in a year if offered three or four a week than if one tries to make him take one daily. When he takes a dislike to this food it may last a long time.

Cocoa is a good food, but to me it has one glaring fault. It takes away appetite. Cocoa is a hunger appeaser, and when taken at breakfast may satisfy the appetite, but the child does not then take sufficient food. Most of the underweight children found in my school inspection work are cocoa drinkers. One morning in examining 16 children, I found that 7 were underweight and 6 of these had had cocoa for breakfast.

But many mothers say, "My child will not take milk; will not eat eggs, spinach, meat, vegetables". There are many reasons, or better, excuses given for this condition: forced feeding, coaxing, over-anxiety, bad example of parents who won't eat this or that.

I classify foods into three categories:

1. Foods which actually disagree with the child, make him ill, bring out urticarial rashes or other allergic manifestations. These foods are carefully noted and excluded from his diet as completely as possible. There are several other foods.

2. Foods which are good for the child but which, at first, he does not like. These are the acquired tastes.

3. Foods which once he liked but now has "gone off of", as we say.

These latter two are also taken out of his diet, for a time, and are reintroduced, *in small quantity when the child is hungry*. Taken under these circumstances, the taste is relished, the proper incentive, hunger, is there, and the next time those foods appear the subconscious mind will act so that foods, not liked before, are taken with tolerance, and later with relish and eagerness. All of you can think of foods you did not care for at first but of which you are now quite fond.

The child should not be rushed or hurried at meal time nor should he be allowed to dawdle with his eating. He should feed himself as soon as he is able to do so without too much mess. It has been amply proved that a child will actually take more food if he feeds himself. One who dawdles is the most common problem. There the amount of food should be reduced. If still not all consumed the meal should end at the proper time and the child allowed to go hungry until the next meal time.

Patience and intelligence can do more to correct, than any amount of punishment, rewards, scolding, coaxing, or other meal-time atrocities.

When a mother expresses her distress at her own problem and makes the oft repeated comment, "I have simply tried everything", one is tempted to tell her she had failed to do the one best thing. If the fault is her own, she should correct it. If the father is at fault, his co-operation must be secured, but whoever is at fault let the family all get together and manifest, until they actually feel the normal, contagious, meal-times psychology that makes the table a happy place for every one, a place where hunger is appeased and where appetite is satisfied; a bright place, a gay place, a place to which every toddler and every child goes at meal-time with the assurances that a pleasant happy time is waiting. The person who shouts "Hurrah, let's eat" will shortly find the youngsters shouting with him. No amount of noise is bad, so long as it is a happy noise, and what a welcome sound for many mothers if shouts of laughter and delight accompanied the good news, "Dinner is ready".

So remembering that what a child takes when he is hungry, he will enjoy, digest, and like again

the next time he sees it; and that the opposite is just as true: what he takes when he is not hungry, what he takes that is forced upon him, he will not like, will not digest well and the next time it is offered his subconscious will bring on rebellion, I leave you with the assurance that "The basis of all feeding is hunger" and there is no difficulty in feeding a hungry, happy child.

To sum up. The average child does not get the foods which are absolutely needed from which to grow and develop properly. A much larger range of diet should be provided during the first and second years and proper food habits established them.

The subconscious mind has a great deal to do with appetite and meal times should be happy times.

If the nutrient substances which must be derived from dietary and other sources in adequate amounts for uninterrupted growth, development and health throughout the prenatal and postnatal periods are to be supplied, much more attention must be given to foods, their kinds and their preparation.

REFERENCES

1. KUGELMASS: Newer Nutrition in Pædiatric Practice, Lippincott, 1940.
2. HUNTER, G. AND PETT, L. B.: *Canad. Pub. Health J.*, May, 1941.

RÉSUMÉ

L'anorexie est un syndrôme qui survient chez les enfants qui n'ont pas la sensation de la faim; et cette sensation est supprimée par l'application de régimes mal appropriés ou trop exclusifs. Il ne faut pas perdre de vue que l'enfant doit manger une quantité donnée des 50 produits nutritifs indispensables. Un mauvais équilibre dans cette répartition amène le dégoût, puis l'anorexie. Il faut savoir quand donner ces produits et à quelle dose. Il faut se débarrasser des préjugés diététiques qui ont encore cours. Il ne faut pas harceler un enfant qui ne veut pas manger, mais profiter du temps où il a faim pour lui faire absorber les aliments qu'il n'aime pas mais dont il a un besoin essentiel. On devra supprimer toute nourriture à laquelle il est allergique. Lorsque les principes nutritifs essentiels seront bien connus, il restera à créer l'atmosphère que les fera accepter avec plaisir, au moment opportun. JEAN SAUCIER

The first medical journal to be published in the United States was a quarterly, the *New York Medical Repositary*, edited by Elihu Hubbard Smith, Edward Miller, and Samuel L. Mitchell, which lasted from 1797 to 1824.

The first English medical journal was the *Medicina Curiosa*, which appeared from June 17 to October 23, 1684.

"The physician must generalize the disease and individualize the patient."—*Hufeland.*

OSSICULECTOMY*

By H. M. Bowen, M.D.

Toronto

UP until about two years ago I did not realize how rare cases of ossiculectomy are. Enquiries among my confrères elicited the information that they were unknown, and, coupled with this, came the regret that I had not kept a better record of the cases which I had seen. I realize too, that I am out on rather thin ice in drawing conclusions from a small number of cases but I believe that I have collected enough evidence for a safe prognostication within certain limits. Naturally, the patient will be concerned about the state of his hearing following the operation and the cessation of the discharge.

The audiograms give an indication of what may be expected in regard to the hearing. A comparison of the postoperative course of the two cases gives an indication of what may be expected in regard to the discharge. In one case the postoperative course was of short duration, in the other, occurrences of discharge with or without pain extending over several months showed that there must have been some small point of infection in which there was imperfect drainage.

In regard to the symptoms, I would mention in order of their importance: (1) Deafness. (2) A mal-odorous discharge of long duration; it is thick and mucoid and sometimes hangs as a string from the perforation. (3) Intermittent attacks of pain, but as a rule this is not severe. (4) Intermittent hæmorrhages.

The physical examination reveals: (1) A grey drum. (2) Either a perforation in Shrapnell's membrane with a small amount of thick stringy discharge or a mass of granulation tissue occupying this area.

In regard to the operation (and it cannot be performed without the proper instruments) there is one very important point which I would like to emphasize. In making the initial incision I was taught to carry it close around the hammer handle. This, I found, made it very difficult to insert the ring knife for the second step but if the incision is carried for some distance downward from the umbo the ring knife can be inserted much more readily. The third step is the dislocation of the incus with the right angle

* Read before the Section of Oto-Laryngology, Academy of Medicine, Toronto, October 27, 1941.

curette, right or left, as the case may be. This is done with a sweeping circular movement and one would ordinarily expect that this would be the most difficult part of the operation. On the contrary, it is surprising how easily the incus drops down when the curette is applied to it.

The amount of hæmorrhage encountered in making the initial incision is remarkable but the suction machine has simplified this a great deal. One point which struck me rather forcibly was the profuse and foul discharge for several days following the operation. The amount of discharge is simply amazing and the odour is in a class by itself.

There is a wide variation in the course of the disease following the operation. One case cleared quickly while the other dragged on for some months: in the latter case the surgeon may have had some reason for doubting the advisability of the operation, not to mention any opinion the patient might have expressed. Then there was the other extreme where the case cleared up rapidly with a great deal of satisfaction to all concerned.

CASE 1

Miss M.W., aged 25. February 29, 1932.

Chief complaint.—Deafness of right ear of 16 years' duration; it varied at times. Pain and intermittent discharge which had been worse the last ten days as a result of a cold.

Examination revealed (1) A perforation in Shrapnell's membrane. (2) Slight redness and bulging of the posterior superior quadrant. (3) Discharge. (4) Lower portion of drum grey in colour; no bulging.

Hearing tests: Spoken voice 10 feet; acoumeter 8 feet; Weber to right; Rinne negative; C not heard; C2 diminished; C4 diminished.

Examination on June 11, 1932, revealed a perforation in Shrapnell's membrane, a small amount of discharge; redness and bulging of upper part of drum had subsided.

Ossiculectomy was performed on July 4, 1932. The ossicles were difficult to remove on account of a considerable amount of scar tissue.

July 8, discharged from hospital.

June 17, 1939, the audiogram shows a loss of hearing of 40%.

CASE 2

Mr. A.C., aged 16. December 29, 1913.

Chief complaint.—Deafness and tinnitus of right ear; occasional attacks of pain followed by discharge. Symptoms have occurred for eight years.

Examination revealed (1) Perforation in Shrapnell's membrane. (2) Redness and bulging of Shrapnell's membrane. (3) Discharge.

Hearing tests: Spoken voice 12 feet; Acoumeter not heard; Weber to right; Rinne negative; C markedly diminished; C2 diminished; C4 diminished.

Caloric test reveals combined rotary and horizontal nystagmus.

March 19, 1914, had an attack of pain three days ago, severe for about three hours. It lessened with discharge. There is slight redness and bulging of Shrapnell's membrane and the Siegel draws out a small amount of discharge from the perforation.

March 23, 1914, ossiculectomy. The surface of the ossicles is quite rough.

March 24, discharge of foul smelling pus mixed with blood.

March 25, profuse discharge; irrigation, alcohol drops.

March 26, profuse discharge, odour not so offensive; irrigation, alcohol drops; discharged from hospital.

March 27, visit at office, profuse discharge, no odour, not so much blood stain, irrigation, inflation, alcohol drops.

March 28th, irrigation, inflation, alcohol drops. Discharge seems more mucous in consistency, slight odour. Portion of tongue seems numb.

March 29, irrigation, inflation, swelling is markedly reduced; perforation is clearly seen. Touching edge of perforation with swab causes pain in tongue.

March 30 and 31, April 1, 2 and 3, irrigation, inflation, Ac. boric insufflations.

April 6th, irrigation, inflation, Ac. boric insufflations. Practically no odour to discharge; perforation is pin point in size.

April 7, left dressings off.

April 8, 9, 10, 11, 12, slight discharge.

April 18, had severe attack of pain last night followed by discharge. There is no bulging or redness of membrane and only a small perforation.

April 24, suppuration ceased, perforation closed.

May 11, has had slight discharge the last two days. Perforation seems to be closed had less tinnitus the last week.

September 11, began to discharge two weeks ago but had no pain. Small perforation, slight discharge.

November 6, irrigation, inflations.

November 13, profuse discharge last night but no pain.

July 30, 1915, the ear is dry, no tinnitus.

March 4, 1939, the audiogram shows a loss of hearing of 41%.

RESULTS

There were three private cases and two out-door cases. One case out of five was a failure and six months later I found it necessary to perform a radical mastoid operation. This was a private case. In the others the results were excellent and in one case especially the improvement in the general health was remarkable. Of course, this happened to be an out-door case.

In one case the loss of hearing was 40% and in the other 41%. In my experience this corresponds very closely with the audiograms following radical mastoid operations.

Before performing the operation I would mention as safeguards: (1) A test for nystagmus to rule out a circumscribed labyrinthitis. (2) An x-ray of the mastoid.

The wise never speak in the superlative, for that mode of speech always offends either Truth or Prudence. Exaggerations are so many prostitutions of reputation, inasmuch as they expose the shallowness of the understanding and the bad taste of the speaker. Exaggeration is a species of lying; he who exaggerates shews himself to be a man of bad taste, and, what is worse, a man of mean intellect.—*Proverbs of Gracian.*

Case Report

FISHBONE PERFORATION OF A MECKEL'S DIVERTICULUM

By J. I. Rossman, M.D.*

Matheson, Ont.

Meckel's diverticulum is that vestigial portion of the vitelline or omphalomesenteric duct which remains attached to the midgut. It is found in about 1.5% of routine autopsies, and in the great majority of cases causes no symptoms. Pathological changes may be due to (1) inflammation; (2) presence of aberrant gastric mucosa, this being liable to ulceration and subsequent hæmorrhage or perforation; (3) the presence of aberrant pancreatic tissue with adenoma formation; (4) intestinal obstruction due to (*a*) inversion of the diverticulum and subsequent intussusception, (*b*) knotting of a long diverticulum about a loop of bowel, (*c*) knotting or kinking of a loop of bowel about a fibrous cord extending from the diverticulum to the umbilicus; (5) perforation by a foreign body.

The latter complication is rare. Only 19 cases are on record and of these 14 were caused by ingested fishbones. The following is the 15th case to be described.

CASE REPORT

F.D., a white male, aged 17 years, was in his usual state of health until 36 hours before he was first seen, at which time he noticed sharp, "sticking" pains in the right lower quadrant of the abdomen. Postoperatively it was learned that, on several occasions in the past few days he had eaten fried fish (pike). The pain was mild and recurrent in nature until about ten hours before admission to hospital, when it became steady and more severe, especially when walking. On several occasions in the previous year he had had transient attacks of abdominal cramps, nausea and vomiting, though these symptoms were absent on this occasion.

Examination revealed a well-developed, young male in no apparent distress. The temperature was 98.4° F., the pulse was 78 per minute, and respirations were 22 per minute. There were 14,000 leucocytes per c.mm. The tonsils were greatly enlarged and the anterior fauces were reddened. There was a distinct cardio-respiratory murmur and the blood pressure was 130 systolic and 80 diastolic. There were several small subcutaneous lipomas on the anterior aspect of the left thigh.

The abdomen was soft save for slight muscular resistance in the right lower quadrant. There was moderate tenderness 2.5 cm. above McBurney's point, with some rebound tenderness referred to the same point. There was generalized tenderness by rectal examination. There were also bilateral, small, indirect, inguinal hernias.

The patient was admitted to Rosedale War Memorial Hospital at Matheson, with the diagnosis of acute appendicitis.

Operative report.—Under general anæsthesia a McBurney incision was made and when the peritoneum was incised there was an escape of about 200 c.c. of clear, yellow fluid which contained small flakes of fibrin. The peritoneum was everywhere reddened.

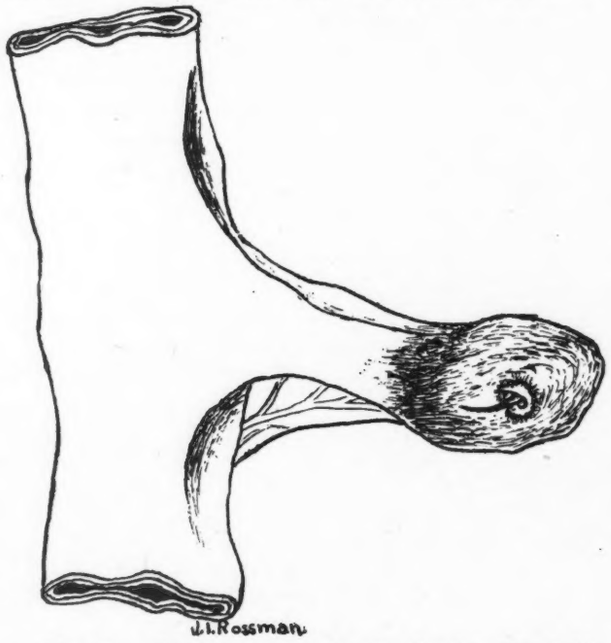

Fig. 1. — Diagrammatic sketch showing Meckel's diverticulum perforated by fishbone.

Collapsed loops of small bowel presented in the wound and to one of these was attached a well-developed Meckel's diverticulum 7 cm. long and 2 cm. wide at the base. It was eccentrically placed and a slender mesentery connected it to the main ileal mesentery. It was about 50 cm. distant from the ileo-cæcal valve. About 2 cm. of the tip portion of the diverticulum was thickened, reddened and bulbous, and covered with stringy, yellow fibrin. Near the very tip was a small area of gangrene about 3 mm. in diameter, and through this, for a distance of 5 mm., projected the pointed end of a fine white fishbone (Fig. 1). It pointed proximally. The diverticulum and the appendix vermiformis were removed. The cæcum was in a high position, suggestive of incomplete cæcal descent. The usual closure in layers was performed. The postoperative course was entirely uneventful.

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On opening the diverticulum the mucosa was found to be reddened but was otherwise without regions of gangrene or gross perforation. About 5 mm. of the fishbone were still in the lumen.

DISCUSSION

The clinical signs and symptoms were mild, a feature first pointed out by Persson.[1] The onset was gradual, the temperature only slightly elevated, and the signs and symptoms of peritonitis only slight. If the appendix vermiformis had been involved one would have expected an inflammation of 36 hours' duration to give rise to more severe signs and symptoms. The high situation of the tenderness should have suggested some lesion present in a Meckel's diverticulum. It is interesting to note that in this case, and in the illustrations of similar cases recorded by Webb,[2] and Weinstein,[3] the projecting end of the fishbone points away from the tip of the diverticulum, suggesting that the duller, wider end of the bone entered the diverticulum first, the after-coming point subsequently impaling the mucosa as the latter was forced against it by peristaltic action.

REFERENCES

1. PERSSON, T.: Meckel's diverticulum perforated by a foreign body, *Acta. Chir. Scandinav.*, 1939, 82: 530.
2. WEBB, R. C.: Meckel's diverticulum perforated by a fishbone, *Ann. Surg.*, 1933, 98: 159.
3. WEINSTEIN, V. A.: Fishbone perforation of a Meckel's diverticulum, *J. Mt. Sinai Hosp.*, 1942, 9: 29.

Special Article

THE U.S. NATIONAL NAVAL MEDICAL CENTRE

(BETHESDA, MARYLAND)

By Surgeon Lieut.-Commander J. L. Little, R.C.N.V.R.

[*Upon the invitation of Rear Admiral Ross T. McIntire, Surgeon General of the United States Navy, five medical officers from the Royal Canadian Navy are now taking part in the short course in Tropical Medicine given at the U.S. National Naval Medical Centre. This description of the Bethesda Centre should be of considerable interest to Canadian medical officers.*—EDITOR.]

The Naval Medical Centre is not merely a magnificent building housing a modern hospital, an extensive research unit, a medical school, and a dental school. It is primarily a training ship on the decks of which a number of the country's ablest medical scientists are engaged in the investigation and solution of the Navy's special problems in the fields of health, disease and pestilence. Their case records and data are gathered from places as remote as Samoa, Dutch Harbour, Casablanca and Panama.

The admiral in command, as well as his captains, commanders and naval surgeons are all graduates of recognized medical schools. In addition, a corps of Hospital Volunteer Specialists including biologists, sanitary engineers, nutritionists, physicists, chemists, and bacteriologists are attached for work in their special fields. Naval surgeons of the permanent force are periodically called in for reports on their areas and to undergo refresher courses. Graduates arrive from the civilian medical schools to enter the Service as interns. Here, too, the doctors enlisting in the Reserve report for indoctrination courses where they learn the documentation, problems, customs and parlance of the "men of the sea". Dental surgeons are also attached for experience, research, teaching appointments, and special indoctrination courses somewhat similar to those given the physicians. The most recent addition is a small group of naval surgeons from the Royal Canadian Navy who have been accepted as students in the tropical disease epidemiology course.

Enlisted personnel, known as, "hospital corpsmen", have an opportunity to secure advanced training at the Centre. Courses in x-ray technique, laboratory procedure, tropical diseases, and epidemiology, as well as administration are provided for specially selected groups of men who have stood out above the average because of their initiative, peculiar gifts, or educational background. In the last major class of some sixty corpsmen over 80% were college graduates, many of whom held Master's or Doctor's degrees.

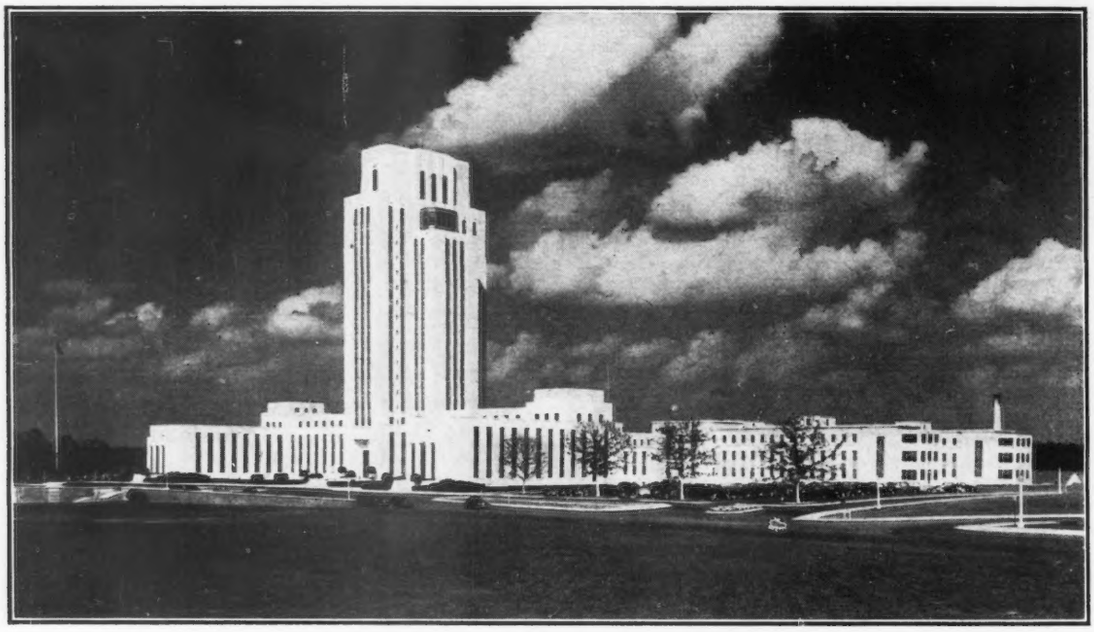
The building is impressive. Its setting and balanced beauty convey repose and quietness. The lofty tower, its clean lines broken with narrow, bronze, window spandrels, rises with the dignity of a monument 270 feet above the bluff on which it stands. The extensive base is a series of three-storied wings in harmony with the tower design. The building material is structural steel faced with pre-cast, exposed, concrete panels. The grounds embrace 265 acres, on which magnolia, sycamore, oak and elm trees will shortly add shade and beauty to the scene. The gleaming whiteness of the buildings stands out against the blue of the sky and the green of the sloping meadow like a piece of artistic sculpture.

The elegance of the interior is in keeping with its external appearance. The lobby is lined with Vermont marble of three colours and trimmed with white bronze. The operating suite is on the second floor. The main operating room is equipped with sound devices for the transmission of the operator's voice. Part of the seventeenth and all of the eighteenth floors are occupied by lounges or solaria for the use of the patients. Each of the floors in the tower is planned in the shape of a Geneva cross and is made up of private or semi-private rooms.

The Medical School occupies the main port wing, while the corresponding starboard quarters are used by the Dental School. Certain classrooms are used by both schools in common. The hospital was designed to take care of the illnesses occurring in a peace-time navy and the accommodation was therefore limited. Skilful addition of temporary units in the rear of the main building permits a present capacity of some 1,200 beds. The special services of the main unit are capable of handling the added load. An auditorium with seating accommodation for six hundred provides a meeting place for assembly and entertainment. The corridors are wide, convenient, and well-lighted. One section of the basement deck is given over to a very modern cafeteria where 600 meals can be served in a half hour. The civilian clerical staff are provided with a snack-bar where they may purchase light lunches at reasonable prices. Modern, tubular-steel furniture and harmonious decoration makes this department a popular meeting centre for the navy men as well as the staff.

The library is stacked for 70,000 volumes. A professional librarian is in charge. There is a commodious reading room where all the necessary medical periodicals are ingeniously displayed for ready reference. Auxiliary service organizations maintain a library of fiction.

Many unusual types of cases are referred to the assembled team of specialists from their naval colleagues, afloat and ashore. Neurosurgeons, tropical disease experts, cardiologists, tumour clinicians, only to mention a few of the branches, are all regularly on duty. An attempt to appraise the difficulties and deficiencies of the medical service in the field is undertaken by interviewing patients who have recently returned from the active war zones. It is felt that these men are far enough away in time and distance to be able to offer constructive advice on the efficiency of the service with which they came in contact.



THE UNITED STATES NATIONAL NAVAL MEDICAL CENTRE

It is not to be forgotten that this splendid project was built in the years of national peace between 1935 and 1940, when materials and men were still available. The President, himself, an old Navy man, deserves much of the credit for its design and the prosecution of the work. His continued personal interest in the fitness, and health of the men of the navy is an old story. It was typical of the man that the project was completed and ready for operation two months after Pearl Harbour challenged the nation.

The environment of the fighting forces creates many new physiological problems which affect their efficiency, health and morale. It is inevitable in a centre like this, where a permanent and scientifically keen Medical Branch is kept at a constant peak of efficiency that new ideas, techniques, and inspiration will find their way out to the young naval surgeons no matter how far abroad their ships may travel.

Clinical and Laboratory Notes

HAIR FIXATION DRESSING

A SIMPLE DRESSING FOR SCALP WOUNDS

By Gordon E. Perrigard, B.A., M.D., C.M.

Montreal

Industrial surgeons have found that men, and particularly women, employed in business and industry have a certain reticence against bulky and conspicuous head dressings for small scalp wounds.

If the wound is large enough for a dressing, it has been found sufficient to tie a small square gauze dressing directly to the hair surrounding the treated wound, then the hair may be interlaced over it. This gives a camouflaged and satisfactory dressing, capable of remaining in place directly over the wound for over ten days.

The procedure is a minor war-economic measure, as only one piece of gauze is required for the dressing. A free piece of black thread about three inches long is threaded through each of the four corners of the gauze dressing with a needle and one end is tied firmly there. These hair fixation dressings may be prepared in advance and placed, sterilized, in a container ready for prompt use. Several may be darkened with argyrol so as to be less conspicuous in dark hair (Fig. 1).

When a patient appears with a scalp laceration, without complications, the scalp adjacent to the wound is shaved clean, and the wound may be prepared with the usual green soap, ether, alcohol, and popular antiseptic, and if suturing is required this is also performed in the usual manner.

If the patient has a very greasy, dirty scalp, one may go so far as to paint regionally with sterilized aluminium chloride solution which tends to retard temporarily perspiration in that region. Incidentally, this procedure may have contributed in reducing postoperative infections over other hairy sites, such as encountered in herniorrhaphies and hydrocele operations, when electric bakers have been employed for gaseous distension.

After suturing the scalp wound, a chemotherapeutic preparation may be applied or the wound left dry and a small gauze dressing placed over it. Then about half a dozen long hairs arising a little distal from one end of the dressing are drawn out and twisted into one strand and a hæmostat is placed on the end to keep the twisted strand of hairs segregated. A similar procedure is carried out opposite the other three corners of the gauze dressing.

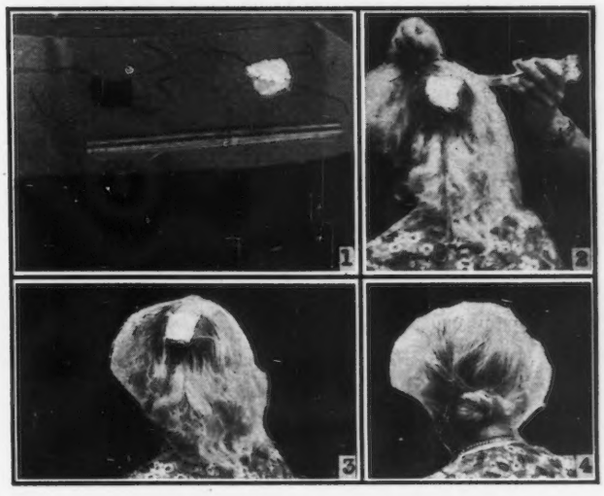


Fig. 1.—Two hair-fixation dressings. The one on the left has been darkened with argyrol. Black threads are tied to each corner. **Fig. 2.**—Corners of the dressing are tied to strands of hair. **Fig. 3.**—Dressing is held firmly in place. **Fig. 4.**—Hair is woven over the dressing.

The four twisted strands of hair are then tied several times snugly to the corresponding pieces of thread which have been fixed to the corners of the dressing (Fig. 2). The order of tying should be arranged so as to pull the wound edges together. Thus the dressing is held firmly in place, movable only with the scalp (Fig. 3).

After cutting the loose ends of the threads, the hair is interlaced over the dressing (Fig. 4). A few daubs of argyrol may help to make it less conspicuous in dark hair.

This dressing requires less shaving of hair and appears to be less contributive to infection than adhesive tapes, bandages, fluids, collodion and paraffin dressings.

That perhaps the most important advance which the war has brought about in the medical mind is the realization that the future of doctoring must be concerned as much with the achievement and maintenance of health as with the treatment of disease is the view of Dr. Frank Howitt, C.V.O. He considers that this awakening is finding expression in a series of terms which are either new or are revivals with a modern application — rehabilitation, social medicine, positive health, preventive medicine. With regard to prevention, Dr. Howitt points out that a number of illnesses are the result of deviations from the normal which have progressed insidiously until symptoms have necessitated advice. He asks, "Must the medical profession confine itself to the reconstruction of damage when this has reached a stage at which normality is no longer possible? Must the State therefore be content with only partial salvage? Surely any system of planning must encompass a prophylactic aspect, embracing not only the educational services and the control of youth centres but also labour as a whole. Medicine should be purposeful and applied. Both physical fitness and rehabilitation are social issues which concern medicine, the ministries, and those responsible for physical education. But throughout all phases, including prophylaxis and final reinstatement medicine must exercise a controlling influence."—*J. Roy. Inst. of Public Health & Hyg.*, 1943, **6**: 55.

Editorial

OVERNUTRITION

PUBLIC interest in nutrition is comparatively new. It would appear that suddenly the medical profession, the pharmaceutical houses and the public have awakened to the obvious fact that the quality of the fuel supplied to the body is of fundamental importance. At the moment the emphasis is on the so-called protective foods, which are the vitamins and to some extent the minerals. It is assumed that these are the things likely to be deficient in diets and if they are present in adequate amounts, appetite will control the rest of the food intake.

It may well be that nutrition enthusiasts are correct in stressing the widespread incidence of inadequate diets. If the standards of adequacy are correct there can be little doubt that dietary deficiencies are very common indeed. We have reasonable evidence to show that these dietary deficiencies are important in the developing child, but their importance in terms of chronic ill health of adults has not been so clearly demonstrated.

In the case of adults certain nutritional defects which are common seem almost to have been forgotten in the preoccupation of the nutritionists in deficiency diseases. A group of individuals selected at random will show few, if any, evidences of vitamin deficiencies. They may be present in subclinical or latent form, but they certainly are not obvious. Such a group, however, will almost invariably show instances of one obvious nutritional defect, that is obesity. This is a defect which is not only disfiguring but one which seriously affects the length of life of the victim and at the same time his enjoyment of it.

Newburgh,[1] in a recent article on the subject of obesity, has brought into timely focus this important public health problem. For years life insurance companies have realized the importance of this condition and have provided for it by requiring the obese individual to pay an extra premium to compensate for his lowered life expectancy. This fact is, of course, generally known, but the importance of it is perhaps not fully appreciated by the medical profession, since in general physicians are more interested in the immediate restoration to usual health than in the more abstract idea of future health and longevity. The following table, presented by Newburgh, gives the actual figures in terms of life insurance experience:

Influence of *Overweight on Mortality in Persons* Aged 45-50 Years.

Pounds overweight	*Increase in death rate over average*
10	8%
20	18%
30	28%
40	45%
50	56%
60	67%
70	81%
90	116%

And, as Rony[2] points out, in the total population the mortality rates of obese men and women are even higher, since the groups of life insurance policy holders include only the best of overweights selected by medical examination as relatively free from other serious impairments.

Obesity exercises its unfavourable influence on many organs but probably the cardiovascular system is the one most commonly affected. It is known that obesity and hypertension are rather closely correlated. In figures, quoted by Rony, of 2,858 overweight and 657 normal weight men who had applied for periodic health examinations provided by life insurance companies, the incidence of hypertension (over 150 mm.hg) was about 5% in the normal weight, 10% in men 25-40% overweight and 33% in men more than 40% overweight. In a group of 10,883 individuals studied by Robinson, Brucer and Mass[3] the same association between hypertension and obesity was shown. For example, of 381 underweight men over 40 years of age 33% showed systolic pressures below 110, 12% systolic pressures above 140.

1. NEWBURGH, L. H.: Obesity, *Arch. Int. Med.*, 1942, **70**: 1033.

2. RONY, H. R.: Obesity and Leanness, Lea & Febiger, Phila., 1940.

3. ROBINSON, S. C., BRUCER, M. AND MASS, J.: Hypertension and obesity, *J. Lab. & Clin. Med.*, 1940, **25**: 807.

Of 1,148 overweight men over 40 years of age 14% had systolic pressures below 110 while 33% had pressures above 140.

The explanation of the relationship of obesity to hypertension is complex. If obesity *per se* produced hypertension one would expect to find it in a higher percentage of obese people than actually occurs. Newburgh lays some stress on the psychosomatic side of obesity. "Obesity is invariably caused by an inflow of energy that exceeds outflow and . . . this disproportion is brought about by abnormality of the appetite. Excessive eating is an expression of a mood. It is a behavioristic response to a person's environment." If Newburgh is correct in this hypothesis it is possible that some of the things which cause obesity may also cause hypertension. Experience has shown however that frequently a reduction in weight is accompanied by a reduction in blood pressure.

So far as cardiac disease and obesity are concerned we do not need to look for psychogenic causes. Rony states, "There is no doubt that the signs of relative cardiac insufficiency are partly due to the mechanical embarrassment of the heart in obesity." In sturdily built active obese persons hypertrophy of the heart commonly occurs. "In the flabby, muscularly undeveloped, inactive obese the heart usually fails to develop hypertrophy, and the increased load on the circulation may lead to dilatation and myodegeneration."

We see in obesity, then, a common phenomenon which has a grave prognostic import. Height-weight tables used to provide for an increase in weight as age advanced. There is little evidence that this is physiological. Robinson and his associates say that yearly increases in weight do not take place in the physically active farmer group. Turner,[4] in a study of nearly 6,000 African natives, showed that weight tended to increase up to the age of 25 and thereafter remained steady for the rest of life. Some authorities state that increase in weight after 25 or 30 years of age must be regarded as pathological.

The control of weight under modern conditions is obviously a concern of nutritionists and should be linked with nutrition programs, otherwise such programs may actually result in a promotion of obesity rather than a reduction. The prevention of obesity is a problem of education, the cure of it a difficult problem of therapy. Most physicians will record far more failures than successes in the treatment of this condition. The advice to eat less, even if accompanied by specific dietary instructions, is usually not heeded for a sufficiently long period to accomplish the desired result. Actual hospitalization is probably indicated in the majority of overweights.

FRANK G. PEDLEY.

4. TURNER, G. A.: Some anthropological notes on South African native mine labourers, *South African Inst. for Med. Research*, 1932, 30, **5**: 302.

Editorial Comments

Maintenance of Medical Supplies

The Wartime Prices and Trade Board has drawn our attention to an aspect of medical supplies which is of interest to hospitals particularly. The Board through its Health Supplies Committee is constantly considering claims for these supplies. It makes submissions of the estimated requirements of the civilian population and in turn receives advices of the quantities which may be taken from the U.S. by Canadian importers. If these allotments of materials, which are made quarterly, are not taken up at the time they may be absorbed by other claimants, and may not be available when a belated request is lodged with the supply houses.

For this reason the users of these materials in Canada should watch their supply position very carefully and when stocks begin to decline orders should be at once placed with the supply houses so as to maintain a steady supply. It is not suggested that any excess supplies should be accumulated, but only that there should be watchfulness.

In the case of sutures for example, it appears that orders for civilian requirements lodged with the U.S. since the first of the year have been rather less than usual, and we have not taken up our quota. It is suggested that the supplies on hand be looked over and if necessary orders be placed with the supply houses so that our right to these materials for the next few months be not allowed to lapse.

Certification of Specialists

We would draw attention to a notice published in this issue by the Royal College of Physicians and Surgeons of Canada, regarding the certification of specialists.

The necessity for some machinery by which those practising only certain defined branches of medicine or surgery could be given the standing of accepted specialists, has been long recognized. But the setting up of an organization to adjudicate on those who should be regarded as specialists is full of difficulty. A beginning had to be made however. Some had to be accepted as specialists in order to have a board to examine claims to this distinction. The most reasonable way of solving the difficulty was by working through an organization composed of men generally accepted as having made their mark in medicine and surgery, that is to say, the Royal College of Physicians and Surgeons of Canada.

Arrangements have now been completed by which the College will undertake the certification of specialists in the subjects named in this notice. Ultimately this certification is to be by means of examination. But, to begin with, certain individuals will be granted certification on specified grounds of length of practice and suitability in other respects. The conditions to be met are all stated in an advertisement appearing in this issue and application forms may be had from Dr. Warren S. Lyman, Honorary Secretary, Royal College of Physicians and Surgeons of Canada, Ottawa.

Medical Economics

A BRIEF ON CANCER CONTROL

Presented to the Special Committee on Social Security of the House of Commons by the Executive Committee of the Department of Cancer Control of the Canadian Medical Association

STATEMENT OF THE PROBLEM

Cancer has become one of the most important of the killing diseases, being surpassed in this respect only by heart disease. The great fall in the general death rate which has taken place during the present century is due very largely to mastery of the infectious diseases caused by bacteria. Cancer, on the other hand, presents one of the main unsolved problems which confront medical science. The disease is often accompanied by long periods of suffering and disability. The efforts of medical science are being directed with considerable success to improving the methods of diagnosis and treatment. An immense amount of research is being conducted on the profoundly difficult problems of the cause and the nature of the disease. For these reasons the subject of cancer demands consideration in any scheme dealing with Health Insurance.

1. *Cancer on the increase.*—The death rate from cancer has been steadily rising. In the year 1926 this rate was 81 per 100,000 population in Canada; in 1941 it had reached 117. At the present time there are at least 50,000 cases of cancer in Canada, and about 13,000 deaths from the disease every year. Out of every ten adults one will probably die of cancer. The actual figure may well be considerably higher, for in large hospitals post-mortem examinations reveal that many patients have suffered from cancer which was undiagnosed during life. Some of the increase which has been observed in all parts of the world, is probably attributable to better methods of diagnosis and also to the fact that a larger percentage of the population is reaching a more mature age, for cancer is preeminently a disease of advancing years. Thus the death rate is highest in Nova Scotia (135.6 in 1940) and in British Columbia (147.5), provinces in which the age composition is the highest. Part of the increase, however, appears to be real, although no satisfactory explanation for this can be given.

2. *Cancer control.*—The term "cancer control", although in general use, is somewhat misleading. The disease cannot be controlled in the sense that small-pox, tuberculosis, and vitamin-deficiencies can be controlled. Control implies prevention, and prevention is only possible when the cause and nature of a disease are understood. But the control of diagnosis and treatment is possible, and marked improvement in results has followed the organization of such control. The two basic requirements for this type of control are *early diagnosis and early treatment.*

In order to facilitate early diagnosis and early treatment, special efforts have been made everywhere by health authorities. For example, the Swedish Government has established a cancer institute at Stockholm, which is recognized as a model for the rest of the world. Patients are brought to this institute from all parts of Sweden for treatment, the Government paying for transportation where necessary. The radium used for treatment in the institute is provided by the Government. During the years that the institute has been functioning, "five year cures" have been obtained in 38.5% of all cases. It must be pointed out that this figure includes all cases of cancer whether early, late or hopeless. Similar schemes for facilitating early diagnosis and treatment have been instituted in Norway and Denmark. One of the chief reasons for the success of these schemes in Scandinavian countries has been the application of the principles of centralization and specialization. Other countries have come to similar conclusions.

3. *Why cancer demands separate consideration.*—It may well be asked why cancer should be separated off from the general group of diseases. There are several reasons. Cancer is a unique disease; its essential nature remains a mystery; and its cause or causes are still unknown. Treatment, if it is to have any chance of success, demands an unusual degree of organization, co-operation, and team work. Such treatment necessitates a highly trained personnel and the use of very expensive apparatus and materials, and may have to be carried on over a prolonged period. In no other disease is a follow-up system so essential for this is the only method by which the ultimate results of various forms of treatment can be determined. In cancer, as in the case of no other disease, recurrence may take place years after an apparent cure has been effected. This is not a second attack, but an indication that the original disease has not been fully eradicated.

4. *Methods of treatment.*—Cancer is at first a local disease, and while it is still local and accessible it is curable. Unfortunately, by the time the disease is recognized it may no longer be localized. This delay in diagnosis is in part due to the doctor, who may not suspect that cancer is the cause of the symptoms of which the patient complains, and in part to the patient, who is unaware of the significance of his or her symptoms, or, being wrongly convinced of the hopelessness of the disease, is afraid to consult a doctor. Delay in treatment may be due to the expense of transportation to a treatment centre, or to reluctance on the part of the patient to give up work for a lengthy course of treatment for a lesion or pathological change which may appear to him to be trivial and insignificant. An adequate follow-up system is essential, not only to determine the results of treatment but also to detect at the earliest possible moment any recurrence of the disease for which further treatment may be necessary.

At the present time there are only two recognized methods of dealing with the disease. The tumour may be removed *surgically* or it may be treated by means of *radiation*, the latter including radium and x-rays. Both methods demand for their success a high degree of specialization. This is true both of the radiologist and the surgeon. The surgical removal of a widely spreading cancer is a very different matter from the removal of an inflamed appendix, and powerful radiation is a dangerous weapon, except in the hands of an expert. Statistical analysis will show a remarkable difference in the final results of treatment carried out under the very best conditions as to highly trained personnel and specialized apparatus compared with those in which conditions are less favourable.

Specialized treatment can best be provided in cancer centres or cancer clinics. These centres will usually be developed in connection with existing hospital facilities, but separate institutions may be established, depending on local conditions which will vary widely. In these centres the most efficient forms of treatment and diagnosis are made available. They serve also as centres for the dissemination of knowledge regarding the disease, and it is here that advances are likely to be made in developing new methods of treatment. The average doctor in the course of a year sees few cases of cancer, whereas the men working in a centre see a large number of cases in the same space of time.

It is evident that early diagnosis and early treatment are and must remain the two basic principles of the management of a cancer case. When the house is threatened with fire the two things you demand are first, a fire department with efficient personnel and the best equipment, and, second, prompt arrival of that department.

EXISTING FACILITIES IN CANADA

The various provinces of Canada have the following facilities for the diagnosis and treatment of cancer.

British Columbia. — The British Columbia Cancer Institute is a semi-voluntary organization receiving aid at the present time from the Provincial Government because of financial difficulties. A supply of radium has been provided by the government, but deep x-ray for purposes of therapy is not available. Cancer clinics have been formed in the Vancouver General Hospital and St. Paul's Hospital, Vancouver, and also in the Jubilee Hospital and St. Joseph's Hospital, Victoria.

Alberta.—In Alberta there are two diagnostic cancer clinics, one at the University Hospital in Edmonton, the other in the Holy Cross Hospital in Calgary. Free diagnosis and free treatment, both by radiation and surgery, are provided at these clinics.

Saskatchewan.—In Saskatchewan the cancer program is directed by the Cancer Commission. This Commission has organized two clinics, one at the Grey Nuns' Hospital, Regina, and the the other at the Saskatoon City Hospital. These clinics are not free, but if the patient is unable to meet the expense of diagnosis and treatment, the Council of the municipality in which he resides assumes the responsibility for payment.

Manitoba.—In Manitoba cancer control comes under the jurisdiction of the "Cancer Relief and Research Institute", an organization set up by statute and subsidized by the Provincial Government. Two clinics are in operation, one at the Winnipeg General Hospital, the other at St. Boniface Hospital. Both come under the supervision of the Institute.

Ontario.—In Ontario there are seven cancer centres situated in the following general hospitals: Ottawa General Hospital; Ottawa Civic Hospital; Kingston General Hospital; Toronto General Hospital; Hamilton General Hospital;

Victoria Hospital, London; Metropolitan Hospital, Windsor. The Provincial Government supplies radium on loan to these seven centres at an original cost to the government of about $450,000. Special forms for recording data on cancer cases are supplied to the clinics by the Department of Health, and the data are summarized yearly by the medical statistician of the Department.

Quebec.—In the Province of Quebec the fight against cancer comes under the direction of "l'Institut du Radium" of the Université de Montréal, which is subsidized by the Provincial Government. There is a cancer clinic at Notre-Dame Hospital in Montreal, and also one at the Hôtel-Dieu at Quebec, which comes under the control of Laval University. Tumour clinics are also in operation at the Montreal General Hospital and the Royal Victoria Hospital. The charge for treatment depends on the ability of the patient to pay. If unable to pay, there is no charge.

New Brunswick.—In New Brunswick there is a Cancer Clinic at the Saint John General Hospital.

Nova Scotia.—In Nova Scotia there is a Cancer Committee in connection with the Victoria General Hospital, Halifax. This Committee sees patients sent in from the province and recommends treatment. The x-ray and radium facilities of the hospital are available for purposes of treatment. Treatment is given without cost to those who are unable to pay.

Prince Edward Island.—In Prince Edward Island there are no cancer clinics or similar organizations designed for the diagnosis and treatment of cancer.

Such, in brief, are the facilities throughout the Dominion for the diagnosis and treatment of cancer. The chief criticism, if any, that could be made with regard to them is that they vary widely, depending largely on the ability of the various provinces to meet the cost of treatment. With a few exceptions, they represent unrelated individual efforts rather than organized groups. In several instances the facilies which exist are not adequate as measured by modern standards.

General Principles of Organization

The Department of Cancer Control of the Canadian Medical Association through its Executive Committee and in consultation with representatives in the various provinces has given careful study to the question of cancer. As a result of this study the Committee begs to suggest that the following general principles of organization should be considered:

1. The diagnosis and treatment of cancer should be included under the Health Insurance section of the National Health Act rather than under the Public Health section.

2. The Health Insurance Section of the Act and/or the First Schedule of the Dominion Act pertinent thereto should provide for the diagnosis and treatment of cancer and research on cancer, to be sponsored by the Federal Government jointly with the Provincial Governments, together with the Provincial Medical Associations, the Medical Faculties of the Universities, and such Hospitals and Treatment Centres as may be concerned. It may be considered advisable to set up a Federal organization in addition to the Provincial organizations recommended below. If such an organization were established it should include representation from the National Research Council.

3. Cancer is a disease whose proper management requires centralization of diagnosis and treatment.

4. The Federal and Provincial Governments should allow no financial, geographic or other obstacles to exist which might prevent any person from receiving early and efficient treatment.

5. A model plan for the management of cancer should be approved and incorporated either in the Health Insurance Section of the Bill, or in the regulations governing the administration of the bill under the titles of Standards and Conditions in Paragraph 4 of the Federal portion of the draft.

Recommendations

With regard to such a plan the Committee wishes to make the following recommendations:

1. That cancer be made a reportable disease, such report to be made to the properly constituted authority of the Province, and to include the means whereby the diagnosis had been made.

It is recognized that it is unusual to make a non-infectious disease reportable, since prevention is the final object of such a measure, and for the present cancer is not preventable. The Committee feels, however, that real advance in our knowledge of the best methods of treatment depend on making the disease reportable, because the only scientific determination of the value of any form of cancer treatment is by a careful statistical analysis of the data. Large numbers of cases of cancer are diagnosed and treated every year all over Canada of which no accurate record of the final result is available. Many other cases are diagnosed and treated by non-medical methods, but under existing conditions it is impossible to appraise the real value of such methods. In order to obtain a complete picture of the cancer problem in Canada it is necessary that every case in every province, no matter by what means it is treated, should be recorded in some central office.

2. That adequate provision be made for the statistical analysis of cancer data. The paramount importance of the statistical method has been explained in the preceding section.

3. That the Provincial Health Insurance Commission establish an organization for the purpose of correlating all cancer activities and of receiving and analyzing reports and data, and that the office of the medical statistician be attached thereto.

4. That this organization should include a representative named by each of the following: each Medical School of the Province; the Provincial Medical Association or Associations; The Department of Health of the Province; and, subsequently, by each of the Cancer Treatment Centres approved by the above-named representatives. It is apparent that a certain amount of latitude must be allowed to the various provinces on account of the different conditions which may exist throughout the country. In the Maritimes, for instance, it might be expedient to plan for a joint effort and a central organization.

Functions of Provincial organization. — The general functions of such an organization to be appointed by the Provincial Health Insurance Commission should be as follows:

(*a*) To advise as to the organization of diagnostic and treatment centres for cancer and the personnel thereof.

(*b*) To assist these centres in the treatment of cancer by means of funds, radium and equipment.

(*c*) To arrange through the Provincial Health Insurance Commission provision for clinics and other diagnostic facilities, including the outlying districts.

(*d*) To receive grants, gifts and bequests, and to administer all funds received.

(*e*) To concern itself with the problems of the transportation of patients who live at a distance from a treatment centre.

(*f*) To participate in a program for the education of the medical and nursing professions, education of the public being developed in collaboration with the Canadian Society for the Control of Cancer.

(*g*) To foster research in cancer, more particularly in respect to clinical and technical problems.

(*h*) To ensure that suitable facilities are provided for (1) convalescent hospitals, and (2) hospitals for incurables, the number, size and location of these to be determined by the individual province.

(*i*) That under the Regional Medical Officer provided for in Section 44-3 (*e*) of the drafted Bill there should be personnel (social service, nursing or secretarial) whose duties it would be to obtain such information relative to cancer patients as might be required by the Provincial organization on cancer, and in general to act in liaison between a cancer patient, his physician, and the central office or treatment centre.

(*j*) To be responsible for the organization of a bureau of investigation of alleged cancer cures. This might be operated as an activity of the Federal Government, somewhat along the lines of the existing arrangements for investigation under the Food and Drugs Act.

Men and Books

CATECHISM IN MEDICAL HISTORY

By Heber C. Jamieson, M.B., F.R.C.P.(C)

Edmonton

QUESTIONS

1. What part did the "Balsam" of the Holy Scriptures play in the "secret dressing" of the mediæval army surgeon?
2. What substance antedated plaster of Paris to stiffen bandages?
3. Name two mediæval uses of a pig's bladder in medicine?
4. How old is the syringe in parenteral procedure?
5. What physician of the sixteenth century gave a new word, "bombast", to the language?
6. Many medicinal preparations are in the form of "spirit". What is the origin of this term as so used?

ANSWERS

1. Many surgeons employed the "Balsam" of the Holy Scriptures or "Samaritan Balsam" in the treatment of wounds. This balsam was composed of equal parts of wine and oil of roses. Sugar and honey of violets were sometimes added. Many soldiers practised the "secret dressing". The blood was sucked out of the wound, then the "Balsam" was squirted into it from the mouth. Now, with no further dressing, the part was bound up. Meanwhile some words were muttered to make it all very mysterious.
2. The mediæval surgeon used white of egg to soak the bandages in.
3. (1) Surgeons cut the bladder into the form of a cross and fastened it over the stump after amputation of the thigh. (2) A small hollow bone or hollow reed was attached to the bladder and this precursor of the syringe was used to give an enema or "clyster". Hippocrates employed this primitive apparatus to inject air into the chest in the original operation of pneumothorax.
4. In 1823 the first advance in getting drugs under the epidermis was made by removing this by blistering followed by application of medicated dressings to the denuded surface. Also setons were saturated with morphine solution and passed through folds of the skin. Lafargue, in 1826, used a lancet, the tip moistened in a solution of morphine, to make a series of punctures along the course

of the sciatica. In 1844 Rynd, of Dublin, for the first time introduced subcutaneously a narcotic fluid, employing a crude device. This consisted of a slender trocar and cannula, the latter attached to a hollow handle. The liquid to be used was placed in the handle which served as a funnel top, pressure on a lever on the side of the device caused the needle to spring back out of the cannula into the handle, allowing the fluid to descend into the wound aperture.

5. Paracelsus (beside Celsus) (1493-1541). Born von Hohenheim, his name was for him not impressive enough and he called himself Theophrastus Aureolus Bombastes Furioso von Hohenheim. He spurned the works of all who went before him. Burning in public the works of Galen and Avicenna, he shouted that they knew nothing, he knew all. Many improvements in pharmacy are attributed to him, especially his teaching that the spirit of drugs should be used, thus initiating the search for alkaloids.
6. Basil Valentine, a fifteenth century alchemist, believed that there were "spirits" in air, water and earth. "Other spirits which cannot speak, nor exhibit themselves by their own power, are those which dwell in men and animals, in plants and minerals. They have an occult, operative life, and manifest themselves by the efficiency of their working: when separated from bodies by our Art they have a most marvellous sanative virtue." This last class of spirits includes the essences and elixirs. How right he was! But could he dream that five centuries would elapse before the spirit of the pancreas and the pituitary would be found; or that of the orange or cod liver isolated; or the active spirit, radium, extracted from that ugly duckling of the minerals, pitchblende.

Medical Societies

Calgary Medical Society

At the April meeting of the Calgary Medical Society, the following officers were elected for 1943-1944: *President*—Dr. Gordon Townsend; *Vice-president*—Dr. J. K. Mulloy; *Treasurer*—Dr. J. V. Follett; *Secretary*—Dr. H. S. McLeod; *Executive Committee*—Drs. A. I. Danks, M. G. Cody, T. Melling.

At a special meeting of the Calgary Medical Society held at the Belcher Military Hospital on May 10, 1943, the members were addressed by Lt.-Col. J. D. Adamson, R.C.A.M.C., of Winnipeg, on "Pneumonitis" and by Lt.-Col. Gordon Fahrni, R.C.A.M.C., also of Winnipeg, on "Spontaneous fractures of bones in soldiers".

G. E. LEARMONTH

Saint John Medical Society

The annual meeting of the Saint John Medical Society was held in the General Hospital late in May. Officers for the year 1943-44 were elected as follows: *President*—Dr. A. L. Donovan; *Vice-president*—Dr. E. A. Petrie; *Secretary*—Dr. K. A. Baird; *Treasurer*—Dr. J. K. Sullivan; *Executive*—Drs. A. S. Kirkland, T. E. Grant and F. Wannamaker.

Dr. E. A. Petrie presented the only paper of the evening, on "Gastric and duodenal lesions". This was one of the best received of many papers read during the year. Fortunately several of the staff of the Sussex Military Hospital were present and their discussion was an additional tribute to the papers, especially that of Major J. K. Poyntz an army radiologist of long army and civilian experience.

A special dinner of the Society was called on May 31 to hear Brigadier J. C. Meakins discuss army medical problems. A very large turnout greeted the speaker, who spoke of new methods of categorization of recruits, venereal disease, handling of casualties in the field, new methods of treatment of wounds and the use of the newer drugs in medicine. This visit of Brigadier Meakins brought to both military and civilian doctors much that was new as well as a new view of the set-up in medicine in the war effort.

La Société Médicale du Camp de Valcartier

A medical society has been formed in Valcartier Camp, under the name of "La Société Médicale du Camp de Valcartier", whose purpose is to maintain a high professional standard among medical officers.

All the medical officers stationed in the camp will be members *ex-officio*.

The members of the executive committee are: *President* — Lt.-Col. S. LeBlond; *First Vice-president*—Lt.-Col. P. Tremblay; *Second Vice-president*—Major V. Demers; *Secretary*—Lieut. J. Boulanger; *Treasurer*—Lieut. R. Turcot.

S. LEBLOND.

Medical War Relief Fund

The following additional subscriptions have been received:

Oxford County Medical Association, Ontario .... $ 5.00
Individual subscriptions from Saskatchewan 85.00

According to the report of the United States National Safety Council the time lost during 1942 through non-fatal injuries to workers was the equivalent to a shut down of the American nation's entire shipbuilding and aircraft industries for 54 days.

Canadian Medical War Services

MEDICAL OFFICERS APPOINTED TO THE R.C.A.M.C. — ACTIVE FORCE APRIL, 1943

(Previous sections appeared in the February, March and May, 1943 issues)

SECTION IX

Name	Address	Date of Appointment
Armitage, G. C.,	Schumacher, Ont.	20-4-43
Benoit, C. F.,	St. Boniface, Man.	6-4-43
Berry, J. V.,	Ottawa	19-4-43
Bookhalter, Ethel Mina,	Winnipeg	1-4-43
Bottomley, H. W.,	Saskatoon, Sask.	1-4-43
Bratek-Kozlowski, F.,	Montreal	2-3-43
Brinsmead, A. N.,	Winnipeg	1-4-43
Bugis, J.,	Edmonton	15-4-43
Chadwick, R. M.,	Winnipeg	31-3-43
Chalke, F. C. R.,	St. Boniface, Man.	9-4-43
Chipperfield, D. V.,	Hubbard, Sask.	1-4-43
Cipriani, J. A.,	Montreal	19-4-43
Collins, D. R.,	Clanwilliam, Man.	1-4-43
Collins, L. B.,	Winnipeg	31-3-43
Cote, R.,	Montreal	1-4-43
Coughman, L. C.,	Salem, Ohio	23-4-43
Countryman, C. J.,	Leaside, Ont.	1-4-43
Curran, Christina Agnes,	Winnipeg	1-4-43
Dewan, J. G.,	Toronto	5-3-43
Dickson, H. E.,	Swift Current, Sask.	1-4-43
Dyker, G. R.,	Rosetown, Sask.	8-3-43
Edwards, K. N.,	Transcona, Man.	1-4-43
Fenwick, J. B.,	Winnipeg	1-3-43
Frantz, W. J.,	Vancouver	1-4-43
Gabel, F. E. J.,	Yorkton, Sask.	1-4-43
Govan, W. R.,	Winnipeg	1-4-43
Grenz, A. H.,	Lipton, Sask.	1-4-43
Groves, K. P.,	Vancouver	15-3-43
Guttormsson, V. J.,	Lundar, Man.	10-4-43
Hamlin, J. H.,	Ottawa	5-4-43
Hunter, J. G.,	Teulon, Man.	31-3-43
Jamieson, F. L.,	Carman, Man.	30-3-43
Johnston, L. E.,	Wetaskiwin, Alta.	19-4-43
Jones, N. H.,	Port Alberni, B.C.	15-4-43
Kristjansson-MacDonell, J. A.,	Winnipeg	1-4-43
Leveille, B. A.,	Chambly Basin, Que.	7-4-43
MacDonald, J. A.,	Winnipeg	1-4-43
Malcolm, J. MacN.,	Winnipeg	1-4-43
Margolis, J.,	Winnipeg	1-4-43
Martin, J. H.,	Neepawa, Man.	1-4-43
Martyniuk, F. J.,	Windsor, Ont.	2-4-43
McCullough, J. A. L.,	Toronto	26-4-43
McKinnon, S. D.,	Rouyn, Que.	12-4-43
Michaud, L. V.,	Quebec	26-3-43
Mitchell, J. R.,	Winnipeg	1-4-43
Monteith, J. S.,	Balcarres, Sask.	8-4-43
Murtaugh, N. E.,	Windsor, Ont.	5-4-43
McSweyn, N. F. A.,	Kamloops, B.C.	1-3-43
Noble, D. S.,	Winnipeg	9-4-43
Phinney, W. M.,	Arcadia, Yarmouth Co., N.S.	2-4-43
Pilcher, F.,	Calgary, Alta.	1-4-43
Powell, C. E.,	Port Arthur, Ont.	23-3-43
Redpath, E. L.,	Souris, Man.	1-4-43
Rinfret, G. G. F.,	Montreal	1-4-43
Ringwood, J. B.,	Edmonton	1-5-43
Rutherford, P. S.,	Iroquois Falls, Ont.	16-3-43
Schmidt, O. A.,	Winnipeg	31-3-43
Sharp, H. H.,	Sussex, N.B.	1-5-43
Smith, E. J.,	Shediac, N.B.	1-3-43
Smith, V. W.,	Victoria, B.C.	1-3-43
Stanfield, H.,	Edmonton	19-4-43
Stevenson, A. C.,	Gothenburg, Nebraska	1-4-43
Stuart, E. A.,	Montreal	19-4-43
Sunderland, K. B.,	Toronto	13-3-43
Toms, A. A.,	Winnipeg	1-4-43
Turner, A. S.,	Edmonton	8-4-43
Victor, M.,	Winnipeg	1-4-43
Wallace, A. W.,	Vancouver	15-5-43
Ward, J. G.,	Winnipeg	6-4-43
Wasserman, M. M.,	Regina, Sask.	7-4-43
Waugh, G. A.,	Carberry, Man.	1-4-43
Winram, R. G.,	Winnipeg	1-4-43
Wolfe, G. W.,	Kenora, Ont.	1-3-43

MEDICAL OFFICERS APPOINTED TO THE R.C.A.M.C. — ACTIVE FORCE MAY, 1943

SECTION X

Name	Address	Date of Appointment
Kusey, E. J.,	Canora, Sask.	
Ruby, R. A.,	Kemptville, Ont.	
Finklestein, M.,	Regina, Sask.	1-5-43
Khan, D. S.,	Regina, Sask	1-5-43
Waslenki, A. J.,	Sedley, Sask.	1-5-43
Simon, S. A.,	Ottawa	1-5-43
Ramsay, C. N.,	Aurora, Ohio, U.S.A.	28-4-43
Friedman, R.,	Montreal	1-5-43
Sheps, C. G.,	Winnipeg	29-4-43
Beath, T.,	Richmond, Va.	19-5-43
Oatway, R. D.,	Green Ridge, Man.	27-4-43
Shapiro, K. L.,	London, Ont.	15-4-43
Bazinet, P. H.,	Montreal	23-4-43
Zealand, G. W.,	Lindsay, Ont.	4-6-43
McKenzie, A. L.,	Toronto	3-5-43
Gould, T. P.,	Toronto	5-5-43
Marcellus, D. F.,	Hamilton, Ont.	28-4-43
Shaver, A. C.,	Vancouver	10-5-43
Jenkins, G. E.,	New Toronto	8-2-43
Maille, R. J. H. L.,	Montreal	12-6-43
Sinclair, J. McK.,	Edmonton, Alta.	7-5-43
Fryer, A. I.,	Winnipeg	10-5-43
Fraser, R. H.,	Vancouver	15-5-43
Grant, F. B.		1-5-43

MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE APRIL, 1943, AS MEDICALLY UNFIT

SECTION XI

Name	Address	Date of Birth
Burkell, C. C.,	Regina, Sask.	1-1-13
Carroll, L. H.,	Haliburton, Ont.	8-8-05
Dorrance, F. S.,	Westmount, Que.	15-1-97
Falardeau, Ivy Frances,	Winnipeg	26-7-00
Lees, F. W.,	Vancouver	11-9-83
McCaffrey, R. P.,	Vancouver	7-1-16
McKay, W. W.,	Ottawa	21-9-95
Oliver, G. D.,	Vancouver	7-10-10

MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE MAY, 1943

SECTION XII

Name	Address	Date struck off strength
Ross, H. R.	Sydney, C.B.	16-4-43
Campbell, D. R.	London, Ont.	7-4-43
Tutt, W. R.	Kingston, Ont.	27-4-43
Butler, K. C.	Ottawa	10-5-43
Roy, A.	St. Remi, Que.	28-4-43
Lemieux, R.	Quebec	
Singleton, A. H.	Rouleau, Sask.	14-5-43
Miller, M.	Timmins, Sask.	20-4-43
Murray, W. A.	Hillsboro, Inverness Co., N.S.	
Harrison, S. R.	Timmins, Ont.	20-3-43
Plante, A. P.	Montreal	

Correspondence

Letter from Dr. Alfred Cox

[*The following extracts are from a personal letter to the Editor by Dr. Alfred Cox of London. Dr. Cox's deep and unwearied interest in our Association is well reflected in his letter.*]

A special word of thanks is due to you for the *Journal* of March. The contribution of Scarlett is first rate—the best thing he has done I think. This feature of your *Journal* is one which no medical journal within my knowledge can equal. "R.L.S." has always been a favourite author of mine. I thought I knew a good deal about him but S.'s analysis of Jekyll and Hyde throws a new light on him and on the subject—the fascinating subject of dual lives.

Your long statement about the negotiations *re* your new medical service is also of great interest. It shows your men are tackling the subject with care and sobriety, and also that you seem to have a sympathetic government to deal with. But these are early days and there are lots of snags, as our people are beginning to find out. They are gradually coming to grips with our Ministry of Health, which, I think seems rather inclined to be in a hurry, which cannot be justified as anything like a complete service will need not only all the doctors *now* available, and those now in the Services when they return, but a good many more. I cannot see that anything definite can be done for some years, though I am all in favour of exploring the possibilities.

I am less worried about the position of our profession than I am about the position of the potential patients (of whom I am one). All this planning seems to me to ignore the *individual* a good deal and we are all individuals, and never more so than when we are ill. These carefully planned services seem to me to take little account of the whimsies, or the prejudices if you like, of the individual. I may have access to a complete service on certain conditions—one of which I expect would be that if I am able I must go to the Centre at certain hours. I wonder how people will like that who have been accustomed to have the doctor go to their homes, for their own convenience?

Then there is the dreadful dilemma (if you still allow private practice) namely that of the growth of a new crop of class distinctions—between the people, who can or will afford to go to a man privately and those who can't. And the distinction between the doctors who join the service, and those who stay outside and take their chance. Many of our men seem to want to have it both ways, *viz.*, to get a salary out of the Service and still be able to charge private fees to the class I have mentioned. As the men who are in the Service are bound to give of their best they obviously can't give any *more* if they get a private fee. I don't like the idea at all. Probably the best solution would be to throw open a complete service to all, irrespective of income, who wish to take advantage of it and to pay for it. But the administrative people insist that such a service cannot be provided unless all the population subscribes.

And in spite of reassuring remarks by our Ministry our men are highly suspicious of any arrangement which will leave the local control in the hands of our present Local Authorities, or anything resembling them.

I think the "first fine careless rapture" over the Beveridge Report is beginning to subside as difficulties like these emerge. But we shall see—and after all I am only an outside observer nowadays.

I am glad to see more reports in French in your *Journal*. This is a gesture which I hope is appreciated. The strength of a national medical organization is diminished if there are in its potential, but not actual working ranks, a large number of men who don't feel quite at home in it, but look to some other body as being more sympathetic.

ALFRED COX.

B.M.A. House,
Tavistock Square,
London, April 21, 1943.

Special Correspondence

The London Letter

(From our own correspondent)

THE HEALTH SERVICE DISCUSSIONS

The burning topic in medical circles is still the Government's proposed comprehensive health service for the Nation. Apart from a pronouncement that it would involve 100% of the population there has been little else authoritatively released for publication. Some newspapers have told the story of what the representative medical committee has been discussing with the Minister of Health, and others have attempted to make deductions from public utterances of Government spokesmen, especially as regards the administrative control.

At the suggestion that "local authorities" might be in charge—that is the present administrative set-up as regards municipal, urban, and county council areas for example — the storm broke and was not appeased by the suggestion that local administration might be of a different type. The "elder spokesmen" of the medical world pleaded for slow evolution, and it became clear that the medical profession just would not, as a majority, work the sort of scheme which seemed to be coming. So after two months of "discussion without commitment" the representative committee told the Minister that no progress was being made and it was agreed that he would put his proposals away and a fresh start could be made.

Meanwhile meetings of all shades of opinion and all the various groups within the profession are being held with varying success. At some a real grasp of the situation is displayed and a real effort made to see what can be done to provide the best sort of medical service for the nation. At others the Beveridge report is denounced amid cheers, which sound strangely irrelevant. Minor controversies go on as to whether or not anything should be even discussed, with a quarter of the profession at least away on service and the rest overworked, and neither concerned with whether or not any change is necessary at all. These are, of course, related to the main issue but effectively answered by the constitution of the country which assumes, rightly or wrongly, that the view of the majority in Parliament as expressed by the Government is the view of the nation. That view is that Beveridge's "assumption B" as regards comprehensive medical service has got to be worked. So planning must and will go on.

TUBERCULOSIS PROGRESS

Nine months ago announcements about fresh attacks on the problems of tuberculosis indicated the line of approach and after a due gestation period the Ministry of Health have told the local health authorities what is expected of them. Mass radiography units are becoming available and the stage is set for earlier diagnosis by this method. Next in importance from the medical aspect, but first from the patient's point of view, are the new financial provisions with standard rates of maintenance and various additional (discretional and special) allowances, which should go far towards removing the financial embarrassments which prevent an ultimate "cure".

Finally the problem of rehabilitation is tackled, in advance of what the Tomlinson Report may make possible, with a spirited effort to make part-time employment a reality without upsetting the economics of normal labour. As one medical journal put it, the new schemes promise to treat the economic symptoms of the disease just as physicians have treated the physical complaints. Anxieties about house, family and jobs will, it is hoped, be got rid of even more effectively than night sweats and loss of weight.

THE NURSES' BILL

Three main objects have been achieved by the new Bill, now passed as an Act: a recognition of assistant nurses, a regulation of nursing agencies and a standardization of training for sister tutors. Some storm has been created by the first of these. There are 16,000 "nurses" in this country doing useful work without a recognized qualification, and it seems better to bring them under control on a register rather than to let them go on as they are. A special committee of the General Nursing Council is to deal with the assistant nurse register and this has brought some protest at the use of this Council, its premises and its machinery, for a task which some nurses think will lower the general status.

As a point in this part of the new Act the title "nurse" will be restricted to the fully qualified and the assistant nurse. No one else can use the title except the children's nursery "nurse" whose claim is established by countless generations of these faithful retainers. Regulation of agencies is overdue and universally accepted. On the training of "sister" tutors a mild argument occurred because it seemed to exclude males, and a suitable adjustment has been made. Incidentally the assistant nurse category will also include the most valuable male nurse who is an ex-service "nurse" (*e.g.*, sick berth ratings of the Navy). It seems strange to find men standing up for their rights as a minority in any profession!

ODDITY

This sex business has its funny side. When Parliament adjourned for Easter the last debate was concerned with the inspection of a soldier (male) by a woman medical officer. Medical members of the House of Commons were, as usual, divided in their opinions. One was sure that emotional development made certain some resentment by men at being examined by women,

and another said that this was wrong and that medical examination should be an unemotional matter. Seeing that medical man-power (so-called) is relatively short it seems stupid that woman doctors cannot be considered capable and acceptable for all the same sort of tasks that their male colleagues perform.

ALAN MONCRIEFF.

London, June, 1943.

Abstracts from Current Literature

Medicine

Treatment of Angina Pectoris with Testosterone Propionate. Lesser, M. A.: *New Eng. J. Med.*, 1943, **228:** 185.

In 1942 the author reported satisfactory results in the treatment of angina pectoris with the use of testosterone. His first report covered twenty-four patients (twenty male and four female). In this study twenty-two further cases are added (twenty-one male, one female) and in addition to subjective improvement it was found that there was an improvement in exercise tolerance, as measured in four patients by the two-step test of Master and Oppenheimer. In this test the patient is made to ascend one side of the steps and down the other and this procedure is repeated until anginal pain is produced. All four patients were carefully tested prior to the institution of therapy and again periodically during treatment, the tests being carried out under controlled conditions (time in relation to meals, room temperature). Testosterone was administered intramuscularly in 25 mgm. doses at intervals of two to five days. Results were uniformly successful in the second group as they had been in the group previously reported. The number of injections required to bring about improvement varied from one patient to another, some being markedly improved by three or four and others requiring eight or more injections before subjective improvement occurred. In the four patients who were tested for their exercise tolerance, and in all four of whom it was found to improve with the treatment, subjective improvement resulted before exercise tolerance could be shown to have benefited.

The number of injections must be individualized for each patient. No untoward effects are to be expected, as none occurred in the entire group. As a rule there is a general lowering of blood pressure levels during therapy.

NORMAN S. SKINNER

Treatment of Cancer of the Prostate with Castration and Administration of Œstrogen. Chute, R. and Willets, A. T.: *New Eng. J. Med.*, 1942, **227:** 863.

Thirty-seven cases of carcinoma of the prostate were treated by the authors, twenty-seven by castration augmented by stilbœstrol, eight cases by stilbœstrol alone and two cases by castration alone. Benefit resulted in all but one case. Stilbœstrol by itself was considered to be as effective as when it was combined with castration except that its effect lasted only during the time of administration of the drug. There was marked improvement in the general condition of the patients and relief from the pain of metastasis was effective and lasting. The size of the prostate was reduced, so much so that in nine of thirteen patients with urinary retention, due to obstruction, the ability to void was re-established.

The acid phosphatase level in the blood decreased markedly after castration and was still further reduced by stilbœstrol whereas the alkaline phosphatase usually rose after the operation and was not affected by stilbœstrol. Bony metastases apparently progressed despite treatment.

The only untoward effect of castration was loss of libido and of the power of erection. Only minor reactions resulted from stilbœstrol which quickly disappeared on discontinuing or decreasing the amount of drug.

NORMAN S. SKINNER

High Fluid Intake in the Management of Œdema, Especially Cardiac Œdema. Schemm, F. R.: *Ann. Int. Med.*, 1942, **17:** 952.

A regimen is presented which permits the effective management of œdema with a high fluid intake by the proper regulation of sodium ingestion. The regimen is based on renal function and water balance principles which the accepted practice of the restriction of fluids appears to ignore. The reasons for a trial of the principles are briefly indicated.

The details of the method, some diet lists, and certain precautions as were evolved from 8 years' experience with 626 separate periods of treatment of 402 cases are given.

S. R. TOWNSEND

Control of the Hyperglycæmia of Obese "Diabetics" by Weight Reduction. Newburgh, L. H.: *Ann. Int. Med.*, 1942, **17:** 935.

The authors contend that the delayed utilization of glucose encountered in obese adults is usually of a fundamentally different nature for several reasons: (1) the disturbance is mild, and clinical acidosis does not occur. (2) Delayed utilization of glucose is a common accompaniment of obesity. (3) If all obese hyperglycæmics are diabetics and their inherent weakness is accentuated by the obesity, then the inherent fault would again become hidden by reduction in weight, but manifest their diabetic state when they suffer from an infection. This is presumably not the case, etc.

The glucose tolerance tests become normal in 77% of these obese adult hyperglycæmic patients who were willing to undergo adequate weight reduction. Reasons are given to support the belief that these persons have not inherited an incurable disease of the tissues that produce insulin. The author explains the hyperglycæmia as a manifestation of obesity.

S. R. TOWNSEND

Surgery

So-called Benign Metastasizing Goitre. Friedman, H. H.: *Arch. Surg.*, 1943, **46:** 377.

Numerous references are contained in medical literature to so-called benign metastasizing goitre and to "metastasizing normal thyroid tissue". Cohnheim, in 1876, first drew attention to this condition. Careful analysis of the cases in the literature reveals that in most instances the diagnosis was based on the clinically benign appearance of the goitre and on the benign microscopic appearance of extirpated metastases. In only 29 of the 77 instances studied by Simpson were there microscopic examinations of the thyroid gland and in many of these there were areas of undoubted carcinoma which went unrecognized.

Patients with so-called "benign metastasizing goitre" have many years later died from frank carcinoma of the thyroid gland. Radical surgical removal of metastatic thyroid tissue, if accessible, as well as of the primary tumour, is indicated, especially because of the almost universal and sometimes fatal occurrences.

The author reports two instances of this type of goitre. In one of these an intracranial tumour was removed which was composed of thyroid gland tissue (papillary adenoma) evidently metastatic.

G. E. LEARMONTH

Residual Lesions of Ulcerative Gastritis. "Lésions persistantes des gastrites ulcéreuses." Judd, E. S.: *Surg., Gyn. & Obst.*, 1942, **75:** 424.

La littérature passée et récente tend à démontrer que les gastrites ulcéreuses sont des états pathologiques pré-

curseurs des cancers gastriques. L'auteur passe en revue les différentes opinions à ce sujet et analyse les différents états pathologiques des ces lésions. Il définit les lésions chroniques des gastrites ulcéreuses comme "un épaississement irrégulier et fibreux de la *muscularis mucosæ*, une atrophie de certaines cellules nobles, une hyperplasie des cellules à mucus et une disposition anarchique consécutive des éléments muqueux." L'étude microscopique des coupes de 200 cancers de l'estomac et l'étude des sections de 78 cas d'estomac non cancéreux prélevées au cours d'examen post-mortem ont été faites dans le but de prouver que ces lésions gastriques existant au niveau de la muqueuse gastrique peuvent être diagnostiquées longtemps avant l'apparition des symptômes cliniques de gastrite.

L'auteur compare ensuite la fréquence des lésions dans les estomacs cancéreux et non cancéreux. Il est démontré que des lésions semblables se produisant à distance du cancer gastrique font penser que toute la muqueuse gastrique a subi des modifications et qu'une longue période a été nécessaire pour que ces modifications aient eu lieu. La différence fondamentale entre un estomac cancéreux et celui qui ne l'est pas réside dans une hyperplasie moindre des cellules à mucus de l'estomac non cancéreux. PIERRE SMITH

Pelvic Dislocations. Taylor, R. G.: *Brit. J. Surg.*, 1942, **118:** 126.

This splendid paper is a valuable and probably unique contribution to the English literature of traumatic surgery. In it the author describes, classifies and outlines treatment for hindquarter dislocations.

Incidence.—Among 13,500 cases (in 3 2/3 years) were 73 pelvic fractures and 13 pelvic dislocations.

Classification.—(1) Mild degree of dislocation of the symphysis pubis in which no change in the sacro-iliac joint can be determined. (2) Dislocated symphysis with sacro-iliac dislocated by subluxation of the ileum upward on the sacrum. (3) Dislocated symphysis with the ileum hinged medially or laterally on the sacrum.

Mechanism of dislocation.—The injury is produced by indirect leverage through the femur, with the hip joint locked in the position of extension and abduction. In this position, with muscles braced and the anterior common ligament of the hip joint taut, the whole hindquarter becomes a rigid unit. The symphysis first is torn apart, then if there is sufficient force the ligaments of the sacro-iliac joint give way. The injury is always unilateral in the sacro-iliac region and is frequently associated with a fracture on the same side of the femur through which the force is transmitted.

Treatment.—All operative treatment designed to fix the surfaces of the symphysis together is dangerous, unnecessary, and based on a false conception of the pathology of the condition. The heavy hindquarters themselves must be approximated. In children this is best accomplished by a plaster cast applied with the patient in the lateral position. In adults, where pressure sores and hypostatic pneumonia are to be expected, a better method is to use a pelvic sling covering iliac crests and greater trochanters, with 10 to 15 pounds at each corner, with the weight ropes crossing over above the patient. Both limbs are placed on Brown's splints. In cases with upward dislocation of the ileum this dislocation is corrected by skeletal traction through a tibial pin before the sling is applied. J. R. LACROIX

Obstetrics and Gynæcology

Hyperthyroidism complicating Pregnancy. McLaughlin, C. W. and McGoogan, L. S.: *Am. J. Obst. & Gyn.*, 1943, **1:** 591.

A series of 19 cases of hyperthyroidism complicating pregnancy is reported. The incidence of pregnancy in established thyroid disease is over three times as high as the incidence of hyperthyroidism developing during pregnancy. The thyrotoxicosis was definitely aggravated by the pregnancy in 74% of the series, increased in 21%, and unaffected in 5%.

Toxæmia of pregnancy, varying in degree, occurred in 62.5% of the eight patients admitted during the third trimester.

Eleven patients were treated conservatively and eight underwent operation for their thyroid disease prior to delivery. One fetal death, and two maternal deaths occurred in this series. Both maternal deaths occurred in patients with adenomatous goitre and hyperthyroidism, confirming the opinion that this is the most serious type of thyroid disease complicating pregnancy.

Thyroidectomy is a safe surgical procedure during pregnancy and should be undertaken at any stage if conservative treatment does not control the thyrotoxicosis.

The treatment of the patient with hyperthyroidism complicating pregnancy should be individualized. Surgical interference will be necessary more frequently in patients with adenomatous goitre and hyperthyroidism than in those with primary exophthalmic goitre.

ROSS MITCHELL

Continuous Caudal Anæsthesia in Obstetrics. Block, N. and Rochberg, S.: *Am. J. Obst. & Gyn.*, 1943, **1:** 645.

A total of 39 patients was given continuous caudal anæsthesia, 31 primiparæ and 8 multiparæ. Although there were no fatalities in this series, the authors feel that no matter how the procaine is administered the danger of an anæsthetic death is still very real. Despite its many advantages the continuous caudal anæsthesia is considered a procedure not to be used indiscriminately. The inherent risk of introducing a needle unknowingly into the spinal canal is constantly present. It may have a place in cases where other forms of analgesia or anæsthesia are contraindicated, but it is felt not to be as safe as the anæsthetics now commonly employed. The authors believe that its use should not become routine, particularly in smaller hospitals where a competent anæsthetist is not always available to cope with the serious complications resulting from an accidental introduction of the anæsthetic agent into the spinal canal.

ROSS MITCHELL

Vitamin B_1 in Prevention of Pregnancy Toxæmia. Browne, F. J.: *Brit. M. J.*, 1943, **1:** 445.

From the results of an investigation in which vitamin B_1 was given to 100 women who were not more than 20 weeks pregnant and continued till term with a like number of controls, it is concluded that so far as the prevention of toxæmia of pregnancy is concerned no beneficial effect is obtained by supplementing the diet with vitamin B_1. ROSS MITCHELL

On Labour in Young and Old Primiparæ. Bromberg, Y. M. and Brzezinski, A.: *J. Obstet. & Gyn., Brit. Emp.*, 1942, **49:** 672.

The course of labour in young primiparæ does not differ in any essential respect from normal labour in general. A slight increase in premature deliveries was noted. The fear of complications in delivery in old primiparæ seems to be exaggerated. Nevertheless, the authors have noticed; (*a*) increased duration of labour. (*b*) A high percentage of dry labour and uterine inertia. (*c*) A great number of premature labours. In young primiparæ the age-factor should not play any principal rôle in the determination of obstetric interventions. The conservative method seems to the writers to be the elective method of conduct in labour of old primiparæ. The indication for Cæsarean section should be considered only when a serious complication is associated with the age-factor. The application of the forceps in young primiparæ was not more frequent than in other primiparæ; in no case was Cæsarean section performed. The rate of Cæsarean sections in old primiparæ was slightly higher than in other primiparæ (1.5% against 0.5%), while the rate of the forceps application was markedly higher than in the other primiparæ (25% as against 2%). In comparison with other reporters,

the authors are more conservative in their treatment. The good results obtained, *i.e.*, no increase in fetal mortality, support the view that the conservative method is justified. P. J. KEARNS

Obstetric Injuries of the Perineum. Magdi, I.: *J. Obstet. & Gyn. Brit. Emp.*, 1942, **49**: 687.

Although most surgeons agree that the best time for the repair of perineal injuries is as soon after their infliction as possible, there is some difference of opinion on this point. Intermediate or delayed repair has been advocated by Alcock, Hirst and Tracy, on the ground that after a few days it is easier (5 to 10 days after delivery) to determine accurately the extent of the damage to the deeper structures.

Gayden and Plass, among others, advise the plastic repair of old perineal tears immediately after the next labour, if repair was not performed at the time of the injury, or has failed. They claim the recognition of the anatomical structures is easier as the parts had just been stretched by the passage of the head. The correct suture of the various layers is therefore facilitated. As almost every variation of technique is based on this argument, one may safely say that it is universally recognized as the most important principle in the repair of perineal trauma. Although agreement does not exist as to the optimum time for the repair of old perineal injuries the weight of opinion seems in favour of choosing a convenient time which need not be related to labour. The state of the pelvic diaphragm, the age, and the obstetric future of the patient, must be considered carefully before one can decide which is the best time for repair and what type and degree of correction is suitable for the particular patient. P. J. KEARNS

Pædiatrics

Prevention of Rickets with Simple Massive Doses of Vitamin D. Wolfe, I. J.: *J. Pæd.*, 1943, **22**: 396.

The possibility of administering a single dose of vitamin D to an infant only two or three times a year in order to protect him against rickets has great public health potentialities. The use of large doses of purified preparations of vitamin D in infants and children has been shown to be safe in single doses or in short-time administration, except in the presence of kidney disease. In this series 75 infants were given 600,000 V.S.P. units of an electrically activated preparation of ergosterol (ertron): divided in two oral doses in precooked cereal and milk at about the 3rd to the 5th months of life. Only 62 of these infants could be followed at the onset of the study; 18 showed mild rickets which healed during the period of observation of from 2 to 7 months after treatment; 44 other infants were followed for from 2 to 7 months and showed no evidence of rickets. Two plans for prophylaxis against rickets are outlined. One is to give daily prophylactic doses of 1,000 units of vitamin D until the infant is 2 or 3 months of age and then to administer a single dose of 600,000 units of vitamin D. The latter dose may be repeated from 4 to 6 months later. The other plan is to give an infant at 1 and 2 months of age, respectively, 50,000 units of vitamin D in formula and then at about 3 months of age to administer a single dose of 600,000 units in precooked cereal, which single dose may be repeated from 4 to 6 months later. S. J. USHER

Cryptorchidism. Lapin, J. H., Klein, W. and Goldsmith, A.: *J. Pæd.*, 1943, **22**: 175.

Thirty-nine cases of boys with cryptorchidism who were given endocrine treatment and followed from 2 to 9 years are presented by the author. Apparent success in 14 cases was reduced to only 6 cases by the omission of patients without treatment, in whom descent of the testis was only partial, and patients in whom hypogonadism ensued. Conclusions reached from these cases and a study of the literature were as follows:

Treatment of cryptorchid testis is advisable to relieve the deficiency of androgenic hormone formation and of spermatogenetic activity and the psychological handicap, provided a procedure is adopted to minimize the danger of puberty præcox, of osseous retardation, and of testicular atrophy. The optimal age for treatment is 14 years. A preliminary test of endocrine therapy is fully justificd in any cryptorchid testes not clearly ectopic. Chorionic gonadotropin (human pregnancy urine preparations) are the only ones free of theoretical objections. The maximal dosage should not greatly exceed 6,000 international units and should be given in small frequent dosages over a 6-week period without any rest period. If the testes do not descend following this treatment, operation should be immediate and further hormone can be given after the testis is imbedded in the scrotum. Ectopic testes should benefit from a similar pre- and post-operative administration of chorionic gonadotropin, except where complicated by a substantial inguinal hernia. S. J. USHER

Ophthalmology

Kerato-Conjunctivitis continues to Spread. *Industrial Hygiene*, 1942, **2**: 1. National Institute of Health, Bethesda, Maryland.

Epidemics of kerato-conjunctivitis, the eye disease which appeared on the west Coast of the United States in September, 1941, have occurred in certain industrial communities in Michigan, New York and Connecticut. The disease begins with an œdema of the eyelid, which gradually spreads to the surface of the eye-ball, secretions increase, and, with secondary infection, may become purulent. Corneal opacities are said to occur in from 40 to 70% of the cases; some of these may be permanent. The disease is thought to be due to a filterable virus.

A large proportion of the infections are unilateral. If no keratitis is present there may be little discomfort, but with the onset of keratitis there is pain, photophobia and lacrimation. The condition lasts usually more than two weeks, and any conjunctivitis of more than ten days' duration should be suspected of being of this epidemic type. The disease is spread probably by direct contact and by the hands of attendants or by soiled articles. For this reason, and particularly in groups like industrial groups, suspected cases should be isolated for at least 15 days.

The disease runs a self-limited course and does not appear to be greatly influenced by any form of treatment. FRANK G. PEDLEY

Urology

Papillomatosis of the Bladder: New Conceptions of Etiology and Treatment. Kirwin, T. J.: *J. Urol.*, 1943, **49**: 1.

Kirwin reviews briefly the theories as to the etiology of benign papillomatous lesions of the bladder and advances the hypothesis that they are caused by infection with a filterable virus. This is based upon the investigation of Wile and Kingery in 1919 on verruca vulgaris. They found that filtrate from curetted warts caused typical warts to form in the skin at the point of inoculation. Rous, Beard and Kidd studied over several years the nature of rabbit papillomas and concluded that they were caused by a filterable virus which had carcinogenic properties. Kirwin's thesis is that electrocoagulation through the cystoscope has been only partly successful and that if papillomatosis of the bladder is the result of virus infection treatment, to be successful, must be directed toward eradication of the growths and prevention of further growth by complete disinfection of all surfaces which may come in contact with the original disease.

The method of treatment involves complete removal through a cystotomy incision, with the cutting loop of all papillary growths present. The exposed bases are then coagulated with the ball electrode. Following this a solution of 50% phenol in glycerin is applied to the areas from which growths have been removed and "also

to the mucosa of the ureteral orifices, prostatic urethra, and bladder cavity throughout. Thus sterilization of all possible sites of recurrence is assured.'' The solution is allowed to act for about three minutes and 95% alcohol is then applied throughout.

The report is based upon four cases only, apparently fairly recently treated, and the author admits that it has been impossible to draw definite conclusions, but hopes that others will give the method sufficient clinical trial to prove its worth in ''one of the most vexatious problems presented by vesical surgery.'' FRANK G. MACK

Chemical Carcinogenesis, Drugs, Dyes, Remedies and Cosmetics with Particular Reference to Bladder Tumours. Davis, E.: *J. Urol.*, 1943, **49:** 14.

Davis discusses at considerable length the large number and variety of proved chemical carcinogenic agents which may be introduced into the body by ingestion, inhalation, injection or cutaneous application. The tendency of papillomata to recur following repeated destruction by cystoscopic fulguration through the years may not be due to recurrences or implants but may be evidence of an individual ''papilloma-forming tendency'' due to some underlying systemic cause. Davis strongly inclines to the theory of some chemical carcinogenic agent. Many are cited such as derivatives of coal tar, crude mineral oils, an anilin dye ''intermediate'', azo dyes and œstrogenic substances. The anilin bladder tumour of dye factory workers develops after years of exposure to what are probably extremely small daily doses.

The theory is advanced that there may be many other carcinogenic agents as yet unknown which are unknowingly encountered in the routine of daily life, and perhaps through the use of many drugs, patent medicines and cosmetics, vitamins, sex hormones, and the tremendous list of anilin dyes used in the colouring of food stuffs and fabrics. FRANK G. MACK

Neurology and Psychiatry

Convulsive Shock Therapy in Elderly Patients. Evans, V. L.: *Am. J. Psych.*, 1943, **99:** No. 4.

This study is concerned with an evaluation of the benefits obtained by the therapeutic induction of convulsions in people who are elderly and oftentimes in a debilitated physical condition. Fifty patients with psychiatric disabilities were treated with electric and metrazol shock. Of these patients 17 were over 60 and 5 over 70 years of age. No patient was refused convulsive shock therapy because of the physical risks involved where it was thought that the therapy might be beneficial from a psychiatric standpoint. Several patients showed obvious physical abnormalities in addition to being older than most cases treated. Seven patients were undernourished to the point of emaciation. Four patients were nearing exhaustion from excitement and increased motor activity at the time treatment was started. Most of the cases had failed to respond to other types of treatment and it seemed almost certain that recovery would not occur unless drastic treatment was instituted. Of the 50 patients treated 21 recovered, 19 improved, and 10 were unimproved by this treatment. The author concludes that although the risks taken seem to be great the complications and untoward results are remarkably few. BARUCH SILVERMAN

Psychopathology of Aging. Diethelm, O. and Rockwell, F. V.: *Am. J. Psych.*, 1943, **99:** 553.

This report is concerned with the psychopathological factors involved in the aging process. A study was made of 110 patients who were admitted to the Payne Whitney Psychiatric Clinic, as well as of a group of ambulatory patients. An analysis of the dynamic factors in this group of patients demonstrated that some individuals suddenly become aware of aging. In the physical field baldness, graying of hair, skin changes, teeth decay, menopause, decrease of general strength and energy may be disturbing factors. The outstanding dynamic factor in both major and minor psychiatric reactions of the patients studied is insecurity, with confidence shaken in one's physical and personality fitness and in one's ability to deal successfully with socio-economic changes. Insecurity is accompanied by anxiety which is associated with agitation, hopelessness, futility or humiliation. Suspiciousness is frequently a reaction to the patient's feelings of inadequacy because of socio-economic insecurity. These reactions are frequently precipitated by changes in work or living conditions. The most striking change in the personality organization of this group of patients is the increasing lack of plasticity and resulting unbending and rigid attitudes. The conclusions drawn from this study are that in the aging individual symptomatology can best be understood in terms of the attitude of society to aging, the individual's personality development, and the psychobiology of the aging period. BARUCH SILVERMAN

Dermatology

Sulfathiazole in Eczematous Pyoderma: Sensitization to Successive Local and Oral Therapy. Report of Twelve Cases. Livingood, C. S. and Pillsbury, D. M.: *J. Am. M. Ass.*, 1943, **121:** 406.

Hypersensitivity Produced by the Topical Application of Sulfathiazole. Cohen, M. H., Thomas, H. B. and Kalisch, A. C.: *J. Am. M. Ass.*, 1943, **121:** 408.

Cutaneous Hypersensitivity to Topical Application of Sulfathiazole. Weiner, A. L.: *J. Am. M. Ass.*, 1943, **121:** 411.

These three papers present the same topic—dermatitis due to sensitization of the skin to sulfathiazole—in different aspects and relationships.

Major Livingood and Lieut.-Col. Pillsbury reported three cases of banal localized chronic dermatitis in which there was secondary pyogenic infection. For the latter 5% sulfathiazole ointment was used for periods varying from thirteen to sixteen days. Following this, oral administration of sulfathiazole resulted promptly in cutaneous reaction with œdema of face and lids, more or less generalized acute dermatitis, fever and malaise. The authors had not observed any pyogenic complications of fungous infections, and the absorption of sulfathiazole from the skin in the reported cases was extremely minute. They were therefore of the opinion that sensitization is more apt to occur in certain types of dermatitis. They also considered that for its induction the reaction required the application of the sulfathiazole for a rather prolonged period (more than five days). They conclude with the injunction that sulfathiazole should not be used indiscriminately in the treatment of eczematous lesions complicated by chronic pyogenic infection, or of chronic impetiginous dermatitis which becomes eczematous; further, that sulfathiazole should be administered by mouth only with caution to patients with this type of dermatitis if the drug had been used locally before.

Cohen and his co-workers report two cases in which the only material difference between them and those in the first paper is that in their cases a generalized dermatitis appeared very shortly after the application of 5% sulfathiazole ointment to the skin. Two or three weeks after this the patients were given sulfathiazole by mouth. This was followed in a few hours by a general systemic and cutaneous reaction such as has previously been described. These authors did not suggest any relationship between the type of skin disease for which the drug was first used locally, or the duration of its application, and the subsequent reactions. Quoting other authors' views regarding possible antigenic properties of sulfathiazole, they conclude that ''sulfathiazole ointment can be considered a noxious chemical substance which can give rise to cutaneous idiosyncrasy''. They urge that the profession should refrain from using sulfathiazole ointment in minor conditions in which less harmful drugs are completely adequate. They consider it should never be used over large areas, or intermittently.

Weiner reports four instances of simple contact dermatitis resulting from the use of sulfathiazole ointment which had been ordered for various cutaneous eruptions. As the author comments, the incidence of this phenomenon is relatively low, although in the reviewer's personal experience it is far from rare.

In summary, these reports demonstrate that cutaneous reactions occur as a form of contact dermatitis to sulfathiazole under otherwise ordinary conditions; they are more likely to occur if the ointment is used over prolonged intervals, intermittently, over moderate-sized or large areas, and especially if the drug is used later by mouth. It cannot yet be stated with assurance that such reactions may not be evoked in the same patient by sulfadiazine and other sulfonamide drugs. (Similar reactions also occur if sulfathiazole is used locally after the drug has been given in therapeutic doses by mouth.) The moral, as all the above authors have pointed out, and which should be widely heeded, is to refrain from using sulfathiazole ointment for minor self-limited infections, especially those which have hitherto been amenable to treatment by well-tried safe drugs. Ignorance of the facts referred to, or disregard of their significance, is resulting in the loss of many man-hours to industry, and the unnecessary occupation of hospital beds, also it may forever probit its administration to sensitized patients when serious bacterial disease occurs at some future date. D. E. H. CLEVELAND

Pathology and Experimental Medicine

So-Called Mixed Tumours of Salivary Glands. Sheldon, W. H.: *Arch. Path.*, 1943, **35:** 1.

Sheldon reviewed a series of 54 tumours originating in the salivary glands and classified them into 4 groups. These tumours were encountered most frequently on the left side, in females, in the 5th and 6th decades. The first group of tumours, forming 35% of the total number, occurred only in the parotid gland. They were irregularly lobulated and well encapsulated and originated from the secretory epithelium. The connective tissue stroma showed extensive degenerative changes of a peculiar myxomatous and pseudocartilaginous character. These benign growths were classified as *adenomas.* The tumours composing the second group made up 46% of the total and occurred most frequently in the parotid gland but also in the submaxillary gland and aberrant salivary tissue. These growths showed irregular lobules surrounded by connective tissue capsules but often intimately related to the uninvolved glandular tissue. The predominant element was the "basket cell", a peculiar contractile myoepithelial cell, which normally lies between the secreting epithelium and the basement membrane. Characteristic duct-like or alveolar structures were found in which the epithelium formed the lining layer and the myoepithelial basket cells in immediate apposition formed the outer layer. The degenerative changes seen in the first group were repeated here and, in addition, islands of cartilage and bone were observed, arising, in the opinion of the author, through metaplasia of the connective tissue. Squamous metaplasia of the epithelial cells was not uncommon. These growths Sheldon calls *mixed tumours*: 20% were malignant.

The tumours of the third group, forming 5% of the series, occurred only in the parotid gland as small, generally solid, well-encapsulated nodules. The tumours were composed of "basket cells" alone which exhibited a considerable degree of pleomorphism. No degenerative changes occurred. One of the tumours was malignant. Since they arise from the myoepithelium, the term *myoepithelioma* was suggested to denote tumours of this category. The fourth group of tumours, forming 13% of the total number, occurred in the parotid and submaxillary glands. These tumours designated as *carcinomas* showed varying sized lobules which were poorly or not at all encapsulated. They arose from the secreting epithelium and were all malignant. H. L. FOSTER

Visceral Lesions Associated with Chronic Infectious (Rheumatoid) Arthritis. Baggenstoss, A. H. and Rosenberg, E. F.: *Arch. Path.*, 1943, **35:** 503.

The clinical records and autopsy findings in 30 cases of rheumatoid arthritis were studied in order to determine the visceral lesions associated with the disease. The results as a whole were disappointing, in that they did not cast any new light on the etiology of this condition. Some features, however, were interesting. In 16 patients (53%) rheumatic heart disease was present at autopsy while only 1 of these patients clinically showed any definite evidence of this condition. These findings, together with those described in other recent papers, add some weight to the researches of Klinge, who concluded that rheumatoid arthritis and rheumatic fever are different manifestations of the same disease. The only other lesion of significance was a low grade, uniform, non-specific glomerulitis in 19 cases. This lesion was not extensive, but occurred frequently enough for the authors to conclude that it was in some manner a sequel or accompaniment of the disease of the joints. Other lesions encountered included splenomegaly, which occurred commonly. In most instances this was either due to chronic passive congestion or to a non-specific proliferation of the reticuloendothelial tissues.

The authors concur with the opinion of others that no characteristic lesions are present in the lymphatic system. Liver lesions were non-specific and did not appear of sufficient degree to affect liver function materially. Various pulmonary diseases were present and the relation of these to the arthritis was discussed. Altogether, the suggestion that a low-grade infective agent is the cause of rheumatoid arthritis seemed to be borne out in these studies by the frequent presence of inflammatory processes in the heart and kidneys, together with the hyperplasia of reticuloendothelial tissue. In addition, the occasional presence of inflammatory lesions in the intestinal tract, pancreas, adrenals, prostate and lungs, and amyloid disease in two cases, was believed to add weight to this hypothesis. R. H. GOURLAY

Hygiene and Public Health

Tuberculosis Control Program of the United States Public Health Service. Parran, T.: *J. Am. M. Ass.*, 1943, **121:** 520.

The program of the Office of Tuberculosis Control of the United States Public Health Service is as follows: (1) Chest x-ray examination of workers in war industries, with follow-up of newly discovered cases by state and local health departments. (2) Extension of this service to families of war workers found to be tuberculous. (3) Extension of the case-finding program of the armed forces to include all recruits of the Coast Guard. (4) Development of a system by which tuberculosis in rejected recruits will be reported promptly to state and city health departments so that necessary attention may be provided within the limits of available local resources. (5) Encouragement and assistance in the establishment of chest x-ray examination procedures in the admitting rooms of general hospitals and state hospitals for the mentally ill. (6) At the request of state and municipal health departments, rapid inventory of existing control programs, and assistance in their reorganization in accordance with wartime needs.

At present the United States Public Health Service has 8 35 mm. photofluorographic x-ray units in operation in wartime industries and 2 4 x 5 inch units also available. Each unit consists of a medical officer, a technician and a clerk, together with the necessary equipment for exposing and processing 300 to 500 small films per 8-hour day. FRANK G. PEDLEY

Medical Care for Small Industries. *Industrial Hygiene* (U.S. Public Health Service), 3, 4 (February, 1943).

The difficulty of providing adequate industrial health services for small plants has long been recognized. The solution seems to be some outside agency with the neces-

sary organization to provide a common service for a number of small plants. Group Health Cooperative, Inc., a non-profit medical insurance organization in New York City has devised such a plan. Services inside the plant would be provided by physicians and nurses (a ratio of one physician per 2,000 employees and one nurse per 500 employees) and would include emergency treatments in accident and disease, pre-employment and periodic examinations, medical check-ups on workers returning after illness, supervision of plant hygiene and health education. Services outside the plant would be rendered by a panel of doctors open to any licensed doctor in the community. No treatment other than emergency treatment would be given to employees in the plant, all cases of sickness and accident would be referred to the panel of doctors. The employer would be charged $1.42 a month per employee. For each home visit by the panel physician the employee would be charged $1.00. Presumably the physician would receive more than this from the central organization. No hospitalization is offered in the above scheme but a separate hospitalization scheme at the rate of $9.60 a year per person or $24.00 a year per family.

FRANK G. PEDLEY

Obituaries

Dr. W. H. K. Anderson. In the recent death of Lieut. Col. W. H. K. Anderson, we have lost a very valued medical officer. Colonel Anderson, who served in the last War with distinction, was brought out of retirement by the authorities on account of his experience and efficiency and he gave excellent service in setting up arrangements in M.D. 11 for many months at the outbreak of the present War.

Dr. Allan Roy Dafoe, who attended Mrs. Oliva Dionne at the birth of the quintuplets in 1934, died at North Bay, Ont., on June 2.

Dr. Dafoe was 59. He died at 11 a.m., five minutes after he had been admitted to hospital here suffering from pneumonia. He became ill shortly after returning from a trip to Toronto.

He was known throughout the world as "the country doctor"—the man who cared for the Dionne quintuplets when nobody conceded them any chance of survival after their birth May 28, 1934.

Dr. Dafoe remained the quintuplets' physician until last year, when he resigned after friction with the quints' parents, Mr. and Mrs. Oliva Dionne. He was succeeded by Dr. I. Joyal, of North Bay.

Since the birth of the quints, Dr. Dafoe had made numerous lecture tours of Canada and the United States and had written a book.

Born in the village of Madoc, 15 miles north of Belleville, May 29, 1883, Dr. Dafoe was the son of a country doctor, William Allan Dafoe. After graduating from the University of Toronto in 1907, he went to the thriving lumber town of Callander to practice.

For 27 years he was an obscure country doctor, unknown outside the Callander district. He brought the quintuplets into the world the morning of May 28, 1934, just one day before his 51st birthday, and became world-famous overnight.

Dr. William John Gardiner, of Toronto, died on May 11. He was in his 58th year.

Born in Clifford, Ont., in 1886, and a graduate from the University of Toronto (1914) Dr. Gardiner taught school for four years before taking up medicine. He set up his first practice in Eldorado, Ont., in the early part of the century, and in 1920 moved to Mount Dennis where he remained until the time of his death.

Dr. Gardiner maintained a keen interest in education and served for several years on the York township consolidated school board. He was the board's first chairman. He was an associate staff member of Toronto Western Hospital.

Surviving are his widow, Mrs. Myrtle Susan McElroy Gardiner, two daughters, two sons, two sisters and four brothers.

Mathias Andrew Heil, R.C.A.M.C., of Lemberg, Sask., died on May 20, 1943, at Christie Street Hospital, Toronto, after a lingering illness. He was born in 1909 and a graduate of the University of Toronto (1933). He was a captain in the Royal Canadian Medical Corps.

Dr. John Jardine, of Wilkie, died in Saskatoon on April 25. Dr. Jardine was born on February 8, 1871, in Prince Edward Island, and graduated from McGill University in 1909, having taught school for several years before entering medicine. He practised as a physician at Summerside, P.E.I., and in 1918 moved to Scott, Saskatchewan, from where he moved to Wilkie in 1932.

Dr. Jardine was a former Liberal member of the Saskatchewan Legislature, representing the Wilkie Constituency in 1938. He served this constituency in a conscientious manner, and was recognized as a man of integrity and high principles. He established an enviable reputation as a physician and surgeon, and also found time to take an interest in civic affairs and in his church.

The late Dr. Jardine was a past worthy master, and a life member of Hiram and Lebanon A.F. and A.M. He leaves his widow and three daughters.

Dr. F. W. Lees. We regret greatly to report the death of Lieut. Col. F. W. Lees, R.C.A.M.C. As Dr. Lees, he has been very well known in Vancouver for many years and his military record is an outstanding one. He won the Military Cross in the last War, and has been a very valuable officer in this one, until his unfortunate illness. Dr. Lees had hosts of friends to mourn his passing.

Dr. James F. McIntosh, of Outremont, died on May 21, at his home following a lengthy illness. Dr. McIntosh practised his profession for nearly 55 years until his retirement 10 years ago. He was in his 83rd year.

Born at St. Polycarpe, Que., he moved to Montreal when a young boy. Upon his graduation from Victoria University, Cobourg, Ont., he moved to Grovernordale, Conn., where he remained 25 years.

Returning to Montreal, Dr. McIntosh set up practice on St. Denis Street, where he remained until his retirement 10 years ago.

Dr. Peter McLaughlin died in Paris, Ont., on May 22. He was born in 1860, and a graduate of Trinity University (1888).

Dr. John Clarke Moore, former M.P., for Chateauguay-Huntingdon and widely known in medical circles in Montreal and the Eastern Townships, died at his home in Huntingdon on May 18. He was in his 71st year and had been retired for the past six years. He had suffered a heart attack about three days before his death.

Dr. Moore was born at St. Chrysostom, Que., in September, 1872, of Scottish parentage and was educated at Huntingdon High School and McGill University (1901). Following his graduation as a medical doctor he returned to Huntingdon to practice his profession.

He was elected to the House of Commons at the general election of July, 1930, as a Conservative and had the distinction of winning a seat which had been held by the Liberals for many years. On the death of Hon. J. A. Robb, who represented Chateauguay-Huntingdon for several years, there was no opposition in the by-election which was held later to fill the

vacancy and D. J. O'Connor, another Liberal, was elected by acclamation. Some months later Dr. Moore defeated Mr. O'Connor in the general election, but was in turn defeated in the general election of 1935.

He is survived by his widow, the former Laura Bell, of Montreal, and a sister.

Dr. G. D. Oliver, Capt. R.C.A.M.C., recently died at Shaughnessy Military Hospital. Dr. Oliver was stationed at Dover, England, with the Emergent Medical Service during the evacuation from Dunkerque. He subsequently returned to Canada and joined the R.C.A.M.C., becoming a medical officer with No. 12 Field Ambulance, and proceeded overseas with that unit, but was later invalided home. Dr. Oliver was formerly an intern in the Vancouver General Hospital, and had many friends in British Columbia.

Dr. Georges Ravenelle, of St. Hyacinthe, specialist in mental diseases, attached to the St. Jean de Dieu Hospital, Montreal, died recently in May, aged forty-three. He was born at St. Pie de Bagot, a son of the late Joseph Ravenelle.

Dr. John Ralph Simmons, in his fiftieth year, Medical Health Officer of Elmira, died on May 20. He was a native of Frankford, and took over the Elmira post 14 years ago after practising for several years in his home village. He was a graduate of Queen's University, Kingston (1918).

Dr. Simmons was a captain in the Medical Corps in the first Great War, serving on several hospital ships and in hospitals overseas. He spent a year in postgraduate work at Broad Street Hospital in New York City. He was a member of Frank Lodge, A.F. and A.M., Frankford, and of the Frankford I.O.F. He is survived by his widow, a daughter, a brother, and a sister.

Dr. J. Neelands Smith, of Toronto, died on May 28, in his 64th year. He was a former medical examiner for the Metropolitan Life Insurance Company at Chicago.

Born at Newmarket, Ont., the son of the late James Smith, and Elizabeth Neelands, Dr. Smith received his early education in Brampton schools. He graduated in medicine from Northwestern University, Chicago, in 1905, and practised for some years in Cincinnati, Ohio, and in Chicago before becoming medical examiner for the Metropolitan Life, which office he held for 10 years.

Dr. Smith came to Canada in 1933, and prior to taking up residence in Toronto, practised in Noeville and other Ontario communities.

Dr. William Warwick died at Fredericton, N.B., on May 29, 1943.

Dr. Warwick was born in Saint John, N.B., in 1881, educated in the public schools of Saint John and graduated from McGill University in 1904. In 1913 he secured his Public Health Diploma from McGill. He served three years overseas in the last Great War, first as a regimental medical officer and then as a major in charge of a mobile laboratory. He maintained his connection with the R.C.A.M.C. in the militia during peace time. Dr. Warwick's public health appointments included service with the Federal Government Quarantine Department as bacteriologist; as Provincial Pathologist and Bacteriologist for New Brunswick for the Federal Department, and in 1920 he joined the Provincial Department of Health as a regional health officer. He was for long closely associated with the late Hon. Dr. W. F. Roberts and his successor in the Ministry of Health. He was largely instrumental in establishing medical inspection of schools, pasteurization of milk, and clinic services in the province. Dr. Warwick interested himself in many of the community enterprises and was particularly identified with Trinity Church in Saint John and Christ Church Cathedral at Fredericton. He served on the vestry of both churches. Dr. Warwick served as chief medical officer for the Provincial Department of Health for eight years, retiring in 1940 owing to ill health. His death was sudden, while driving his motor car. He maintained his interest in medicine and his medical gatherings up to his death, and it was rarely if ever that he missed attending his local and provincial society meetings. After his retirement he was made a life member of the Canadian Public Health Association.

"Bill" Warwick was known widely across Canada and as a golfer, Rotarian, Mason, public health expert, and gentleman. He had a host of friends who appreciated his exceptional genial good nature, wise judgment and a considerate courtesy which was a byword wherever he went. He was the exemplar among public health officials, for he could do his duty, always difficult in public health work, and by tact, fairness, and courtesy maintained the perfect relationships between his department, the public and doctors so essential to the furtherance of public health for the public good.

A. S. KIRKLAND

Dr. Harold Edward Welsh, of Roslin, Ont., was drowned accidentally in Algonquin Park, on May 20. He was born in 1896 and a graduate of the University of Toronto (1924).

Dr. Welsh, member for East Hastings, one of the most popular members of the Legislature, was a native of the Madoc district and was victor in the famous East Hastings by-election of 1936 when the Hepburn-Separate School issue was in full swing. Dr. Welsh was nominated as Conservative standard-bearer in one of the wildest nomination meetings ever held in the riding and then won the election with a majority of 5,000.

Dr. Welsh worked his way through school, and for many years served as a country doctor to a rural population. His widow and two children survive.

Dr. Edwin Ernest Willis, of Buckhorn, Ont., died on May 2.

Dr. Willis was L.R.C.S.(Edin.) (1875) and a former medical officer of the Royal Navy and on retiring he came to Buckhorn, where he established a practice. At the time of his death he was in his 75th year and was a member of the Anglican church. Dr. Willis was also known because of his connection with the "Examiner" as a correspondent for many years.

Surviving are his widow, Mary A. Willis, and a daughter.

News Items

Alberta

The amendments to the Workmen's Compensation Act, or, rather, the new Act, provides for all funds to be taken from industry and there shall be three full time commissioners, not one full time and two part time, as formerly. When the workman is disabled for more than 14 days, he gets paid for the first three days, where before he had to wait 30 days, that is, his disability had to last 30 days before he drew allowance for the first three days. In the old Act notice had to be given by the workman to the employer on the date of the accident and in any event before he voluntarily left the employment in which he was injured. Now, however, notice shall be given as soon as practicable.

In the matter of the right of appeal from the decision of the Board to a specialist in the particular class of injury or ailment in respect of which the workman is claiming compensation, two specialists are nominated by the Board after consultation with the workman's physician and the workman selects one of these two. The former provision for a panel of physi-

cians for re-examination is abolished. When an injured workman accepts a lump sum in payment for the loss through injury, he cannot come back for further consideration.

The Board is empowered to establish hospitals where it considers it necessary and also to establish therapeutic clinics.

The Labour Welfare Act provides that employers must provide chairs, when ordered, for the convenience of workmen at work, when this is feasible. Employers must provide suitable dining rooms other than where manufacturing is being carried on and no food shall be taken into any room where specified conditions exist.

An experiment is being tried this year in a health camp at Elk Island Park, to increase the weight of boys and to teach them the value of proper nutrition. Thirty boys will be taken to camp where they will spend a month. Medical examinations will be made, with medical and dental care as well as physical instruction. The Lamont Health Unit and the Department of Education are co-operating.

Dr. J. S. McEachern, of Calgary, has been nominated as life member of the Canadian Medical Association.

It has been decided to hold the annual meeting of the Canadian Medical Association, Alberta Division, in Calgary, about September 13, 14, 15, 1943. Several speakers are expected from the East and local talent also. There are to be several round-table conferences, and one special session will be devoted to the question of health insurance. G. E. LEARMONTH

British Columbia

Several men attended the meetings of General Council of the Canadian Medical Association in Montreal, June 14 and 15. Among these were: Drs. F. M. Auld, of Nelson; E. W. Boak, of Victoria; P. A. C. Cousland, of Victoria; A. H. Spohn, of Vancouver; P. L. Straith, of Courtenay; Ethlyn Trapp, of Vancouver and M. W. Thomas.

The Summer School of the Vancouver Medical Association will be held in the Hotel Vancouver, from June 22 to 25 inclusive. An excellent program has been arranged, and the following speakers are taking part: Lieut.-Col. J. D. Adamson, R.C.A.M.C., Consultant in Medicine; Dr. M. M. Cantor, Assistant Professor of Biochemistry, University of Alberta, Edmonton; Lieut.-Col. G. S. Fahrni, R.C.A.M.C., Consultant in Surgery; Dr. F. Kennedy, Professor of Clinical Neurology, Cornell University Medical College, New York; Dr. B. T. King, Seattle; Brigadier J. C. Meakins, R.C.A.M.C., Deputy Director General of Medical Services; Dr. E. M. Robertson, Department of Obstetrics and Gynæcology, Queen's University, Faculty of Medicine, Kingston, Ont.

Miss Grace M. Fairley, R.N., who has been Superintendent of the Nursing School of the Vancouver General Hospital for several years, has resigned and her place has been taken by Miss Elinor Palliser, who has recently assumed her duties. Miss Fairley's leaving has caused very great regret amongst both members of the staff of the Hospital and members of the medical profession in general, by whom she has always been regarded with great esteem. Her work at the Vancouver General Hospital has been outstanding, and she has taken a prominent part in many public activities. She has stood consistently for improvement of conditions of work and living for the nurses in training under her. Her successor is receiving a cordial welcome.

The Vancouver General Hospital is gradually opening up its new addition but difficulties in obtaining equipment are delaying the full realization of the advantages presented by these new buildings. So far the administration offices and the physio-therapy department have been opened; the latter has at last realized its needs for space and adequate arrangement, which were hitherto conspicuously lacking and made the work very difficult for the staff. J. H. MACDERMOT

Manitoba

St. Boniface has been advised by the Health Unit Advisory Council of Manitoba of the winning of the 1943 Award of Merit, presented annually to the city in Canada below 50,000 population with the best health unit.

Stricter control measures to combat tuberculosis have been authorized by the Manitoba government on recommendation of the provincial health board. To make them effective there has been a revision of regulations of the Public Health Act.

One of the changes is compulsory institutional treatment if there is evidence that for public health purposes it is desirable. Persons affected by tuberculosis who refuse to take precautionary measures to protect members of their households from exposure to the disease may be detained in a sanatorium or hospital. The detention order may be issued by a magistrate.

The compulsory feature is also extended to patients in an institution. A patient in a sanatorium or hospital who refuses to take precaution to safeguard other patients from exposure may be segregated for a period not exceeding a year. This can be done by a magistrate who may issue the order if there is enough evidence to support the application.

Persons suffering from tuberculosis may not be employed in any industry where food is handled or prepared. Attendance at school is prohibited if a patient is known to be suffering from the disease. Persons exposed to possible infection will be required to submit to medical examination. Raw or unpasteurized milk or cream may not be sold unless it is from tuberculosis-free herds. There is a right of appeal to the Minister of Health. The minister's order is final.

An effort is being made in Winnipeg to have all pregnant women receive x-ray examination of the chest to exclude the possibility of pulmonary tuberculosis.
ROSS MITCHELL

New Brunswick

Dr. C. W. MacMillan, of Fredericton, was elected Honorary President and Dr. H. A. Farris, of Saint John, was elected President of the New Brunswick Competitive Musical Festival Association at the June meeting of that organization.

Dr. P. C. Laporte, of Edmunston, was made a member of the Order of the British Empire in the King's birthday honour list for patriotic and philanthropic services. Dr. Laporte has for years been a very active member of the executive committee of the New Brunswick Division of the Canadian Medical Association and is also a member of the Council of Physicians and Surgeons of New Brunswick.

Dr. Ruth Brown, of Saint John, as the provincial vice-president attended the meeting of the Canadian Women's Medical Society in Toronto recently.

On June 1 the new Venereal Disease Act became operative in New Brunswick. This legislation is a considerable advance on anything previously in force in this province. Not only the person infected with venereal disease but anyone who has reason to believe he may be infected is under compulsion to seek medical advice and treatment. Those unable to pay for such treatment must appear before the local public health physician who will arrange for examination and treatment. All reports are of course confidential, but the making of full reports to the Department of Health by physicians is obligatory. A. S. KIRKLAND

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Nova Scotia

Trial of Canadian housewives for two years past, the domestic health problem has reached out its dish-pan hands to threaten Nova Scotia's public health. "We can admit only emergency cases till further notice", announced the Victoria General Hospital, "because of the shortage of domestic help". "Wanted!" cried the Nova Scotia Hospital, in the classified section of the press, "a housekeeper, a cook, seven maids". At Halifax, the Infectious Disease Hospital closed a ward, through lack of domestic help, while diphtheria, in the mysterious, virulent, local strain strikes both at toxoided and Schiek-negative victims. "A very difficult problem", said Health Minister Dr. Davis, as by dint of hard work he and his department relieved somewhat the acuteness of a problem not of their creating, and beyond their jurisdiction. Meanwhile young women who loved uniforms, high salaries, or both, in their democratic freedom and heeding the posters on every street corner, went to the Dominion government offices where they got one or other, or both.

The Maritime Hospital Association, Inc., has begun work on its "non-profit community service to provide hospital care through the prepayment of small monthly, or other periodic subscriptions, retaining the values inherent in private medical practice and hospitalization." Members of the Maritime Hospital Association, Inc., are all hospitals of the Maritimes not of government ownership. A bill incorporating their plan was introduced at the last meeting of the Legislature by Dr. F. R. Davis.

New Canadian hospital ship, *Lady Nelson*, was inspected at her Halifax dock by a group of Army, Navy and Air Force officials. Repaired and completely refitted since her torpedoing at St. Lucia, B.W.I., the *Lady Nelson* is ready to sail on any sea where trouble beckons.

Meat rationing means more beef for the moderate consumer who could get none in pre-rationing days. More beef means less pork consumed. Less pork means less trichinosis, which distressing but rarely mortal disease has set up aches, lumps and fevers in the soft tissues of many Nova Scotians in recent months.

ARTHUR L. MURPHY

Ontario

Squadron-Leader A. H. Sellers, B.A., M.D., D.P.H., who, in civil life, is director of the Division of Medical Statistics, Ontario Department of Public Health, is the recipient of a medal from the Professional Institute of the Civil Service of Canada. The citation is for outstanding contributions to Canada's war effort and national and world well being.

A year ago the Faculty of Medicine, University of Toronto, was faced with a registration in the first year that would have swamped the facilities of the laboratories. The applicants were carefully considered and a class of 150 was selected. The results of the examinations, recently held, is an interesting comment on the value of a preliminary winnowing of the students applying for registration. Only 10% failed in contrast with a rate of 30 to 40% in previous classes.

The annual session of the Ontario Medical Association was held in the holiday atmosphere of the General Brock Hotel in Niagara Falls May 24 to 26. The report of the committee dealing with co-operation or a merger with the College of Physicians and Surgeons of Ontario and the collection of a compulsory fee covering the dues of both bodies was referred back for further study. The scientific program occupied only one day and was given up to military medicine.

The Lancet of May 1 reports a story from Shanghai that associates itself with Toronto. The Japanese seized all medical supplies and five hundred diabetics were left with a very scant stock of insulin. A Glasgow chemist who had been working on textile finishing and leather manufacture for six years was the only person available to supply the need. He read Bulletin No. 10 of the Connaught Laboratories, visited an official in order to procure 70 lbs. of beef pancreas and went to work in the Public Health Laboratories. He had no centrifuge and no filter press. He used a jelly bag for the latter. He had to account for all alcohol used, so condensed the vapour as it was given off and recovered it. He was able to borrow a potentiometer to adjust the pH of his mixture and got 25,000 units before he was betrayed by a Korean with Japanese sympathies. Tokio allowed the manufacture to go on provided that a large proportion of the product was given to the government.

Honours have come to a number of Ontario medical officers in the birthday list of His Majesty. Air Commodore Charles Roy Slemon, Senior Air Staff Officer, has been given the C.B.E. Major Arthur Singleton, Canadian General Hospital No. 15, Surgeon Capt. A. McCallum, R.C.N., R. B. Defries, Professor and Head of the Department of Hygiene, University of Toronto, Guilford Bench Reed, of Kingston, Allen G. Shenstone, Adrian Cambron, of Ottawa, W. Kirk Colbeck, of Welland, members of the Order of the British Empire. Squadron Officer Jean Davey, R.C.A.F., was awarded the O.B.E., military division.

Lt. Thomas Laird Alexander son of Dr. S. Laird Alexander, of Toronto, was given the M.B.E. for gallant conduct in military services.

On May 27 the Academy of Medicine, Toronto, had as its guest Mr. Geoffrey Jefferson, Director of Neurological Surgery in the Royal Infirmary of Manchester, and war time consultant to the British Government. About forty Fellows of the Academy met Mr. Jefferson at dinner, after which he addressed a full meeting on a study of 115 cases of head injury operated upon by him in the last war. Searches through the files of the Pensions Office in Great Britain and Canada and examination of reports enabled Mr. Jefferson to give the present status of a large proportion of the cases. He paid particular attention to traumatic epilepsy as a consequence of intracranial wounds.

M. H. V. CAMERON

Quebec

The annual series of "Days of Medical Study" inaugurated by the Montreal Medical Society in 1940, have proved a worthy initiative, and have had a steadily growing success, Dr. Adelard Groulx, director of the City Health Department said, in opening the 1943 sessions at the Hotel Dieu on June 14.

"The object of these Days of Medical Study", he explained, "is to enable medical practitioners in Montreal and its suburbs to freshen up on medical matters, by hearing, in our hospitals, the explanation of new theories, with clinical study of various diseases, the demonstration of new methods of diagnosis and treatment." All medical men, he added, should register for these days of study, placed at their disposal.

These clinical sessions, he pointed out, also provide lectures by outstanding authorities on important present-day questions and problems.

The sessions will continue in the Verdun, St. Justine and Notre Dame Hospitals, for four days. There was a special session on public health on Thursday. The sessions ended Thursday evening with the annual dinner of the Medical Society in the Cercle Universitaire.

Infantile mortality in Montreal for the first four months of this year showed a notable increase over that of the same period last year, according to a report just issued by Dr. Adelard Groulx, director of the city Health Department.

The figure for the first four months of this year, is 74.93 deaths per 1,000 living births, as compared with 50.29 for the same period a year ago. This is partly explained by a rather high incidence of a type of infantile pneumonia, according to Health Department records, also partly to an increase in the diphtheria rate, from 1.62 per 1,000 last year to 3.5 this year.

On the other hand, the incidence of contagious diseases has been notably reduced this year. Up to April 30, 1943, there were 5,005 cases of contagious diseases, as against 11,632 during the same period of 1942.

The only contagious diseases that showed any considerable increase were diphtheria, from 45 cases in 1942 to 57 in 1943, and scarlet fever from 711 to 889 cases. Measles were down from 3,778 to 1,647 cases; whooping cough from 1,402 to 652 and mumps from 3,337 to 182.

There were, however, 57 cases of paratyphoid fever, of which none appeared in the same period of 1942. One case of amœbic dysentery also appeared, as against none a year ago.

The general death-rate rose from 10.82 for the first four months of 1942, to 10.96 this year, per 1,000 population. Heart troubles topped the list, causing 245 deaths per 100,000 population, and nephritis followed with 154.45, cancer coming third with 135.

Dr. Charles K. P. Henry has been elected president of the Canadian Association of Clinical Surgeons, at the association's 47th annual meeting in Toronto.

It was decided to hold the 1944 annual meeting in Montreal.

Besides clinical sessions at the two-day meeting, matters affecting the training of surgeons for the Army, Navy and Air Force were discussed, as also were the projected health insurance scheme, various phases of university teaching and the staff problem facing all hospitals because of the war.

Les statistiques démographiques démontrent qu'en ces trois dernières années la population du Québec a augmenté de 172,081 âmes.

Le Dr J. A. Couillard, président de la Ligue antituberculeuse canadienne a été appelé à Ottawa pour y remplir une importante fonction dans le corps médical; il a été nommé lieutenant-colonel.

Le Dr Albert Laroche de la R.C.N.V.R. a été promu au rang de chirurgien-capitaine.

Mlle Madeleine Longtin s'est classée première de la promotion de mars 1943 à la faculté de médecine de l'Université de Montréal. Elle a obtenu son doctorat en médecine avec *très grande distinction.*

JEAN SAUCIER

Saskatchewan

The members of the Saskatoon and District Medical Society were guests of No. 7 Initial Training School, R.C.A.F., on the evening of March 23.

Two very informative papers were given: the first by S./L. A. W. Lapin, on "Special physiology of flight"; the second, "An introduction to the Rorschach personality test", by F./L. G. M. Stephens. Medical members from other branches of the armed services were also present.

Following the very interesting addresses given, the men were then shown the Medical Selection Board Building, in which they were taken for an "ascent" of six thousand feet.

Refreshments were served in the Officers' Mess.

Following this practical demonstration a vote of thanks was proposed to S./L. A. W. Lapin, for the hospitality and the opportunity to study methods used by the R.C.A.F., in their selection of personnel.

Mention was made, too, that No. 7 Initial Training School, had received the efficiency pennant for that quarter for the whole of Canada.

The civilian medical men were particularly impressed with the nature of work as compared with that of civilian practice.

Dr. Frank S. McDonald, who was formerly associated with Dr. Jack Anderson, has left Saskatoon to join the Royal Canadian Army Medical Corps.

Dr. Elmer S. Wait, who for some years practised with Dr. A. Lynch, in Saskatoon, and for the past number of years carried on an extensive practice of his own, has left recently for British Columbia.

Prior to his departure a number of the local men gave an informal reception for Dr. Wait, at the home of Dr. F. W. Rosher.

H. D. HART

General

Among the Birthday Honours of His Majesty the King on June 2, 1943, "To be a Companion of the Imperial Service Order", Dr. Hugh Hunter Cowperthwaite, Senior Surgeon at the General Hospital, St. John's, Newfoundland. Dr. Cowperthwaite, a graduate of McGill University, Medicine 1903, has been on the surgical staff of the General Hospital, St. John's, for the last thirty-five years. An able surgeon and a devoted member of the General Hospital staff, the honour is well merited.

American Board of Obstetrics and Gynecology, Inc.—The annual meeting of the Board was held at Pittsburgh, Pennsylvania, from May 20 to 25, 1943, at which time 108 candidates were certified.

A number of changes in Board regulations and requirements were put into effect. Several of these changes are designed to broaden the requirements for candidates in Service. Examples are the allowance of a stipulated amount of credit toward special training requirements for men in Service and assigned to general surgical positions, special training allowances on a preceptorship basis for men assigned to obstetrical or gynæcological duties in military hospitals and working under the supervision of diplomates or recognized obstetrician-gynæcologists, as well as credit toward the "time in practice" requirement of the Board to be allowed for time in military service.

The Board will no longer require a general rotating internship, but will now accept a one year intern service, although the rotating internship is preferable. Such services must be in institutions approved by the Council on Medical Education and Hospitals of the American Medical Association. Lists of such institutions are published regularly in the Education Number of the *Journal of the American Medical Association.*

The Board has ruled temporarily to excuse men in military service from the submission of case records at the stipulated examination times, thereby permitting them to proceed without further delay with the Board examinations. This does not obligate the Board, however, to waive the case record requirement for such candidates. Plans have been made to provide similarly for Service men upon their eventual discharge from the Armed Forces, and to permit the greater use of operations done while in residency or in civilian practice before the war.

The next Part I examination of the Board (written paper and submission of case records) will be held on Saturday afternoon, February 12, 1944, at a place convenient to the location of the candidate, whether he be in civilian or military life. Applications must be in the office of the secretary by November 15, 1943, ninety days in advance of the examination date. The time and place of the spring 1944 (Part II) examination will be announced later.

Applications and Bulletins of detailed information regarding the Board requirements will be sent upon request to the Secretary's Office, 1015 Highland Building, Pittsburgh, Pennsylvania.

Pensions for Cuban Doctors.—The House of Representatives and Senate of Cuba have approved a bill to create a pension fund for physicians. It has been sent to the President for his signature. The fund will be set up from the following taxes, a sales tax of 1% on all pharmaceuticals, a tax on mutual benefit associations, and 3% of the earnings of each doctor.—*J. Canad. Dental Ass.*, May, 1943.

Quarterly Review of Obstetrics and Gynæcology.—This is a new venture in abstracting. In some respects it is replacing the German abstract journal, *Berichte uber die Gesamte Gynäkologie und Geburtshilfe*, which is not now available, but it aims at much greater accessibility. It is devoted of course to a special field, but it will attempt to cover this with the greatest thoroughness.

Book Reviews

Textbook of Surgical Treatment. Edited by C. F. W. Illingworth. 528 pp., illust. $8.50. Livingstone, Edinburgh; Macmillan, Toronto, 1943.

This book is designed for senior students and those beginning special training in surgery. With this limitation in mind it is to be recommended in the highest terms of praise. The reviewer has seldom, if ever, seen the whole field of general surgery so adequately covered in so short a space. The tyro to whom the work is addressed, or the general practitioner who may meet any of the conditions described will find that operative techniques are not described in sufficient detail to be followed by an amateur operator but are clear statements of what can be done by skilled surgeons to whom the serious cases may be referred. The contributors have condensed a vast amount of reading and experience into a volume that would make a perfect *vade mecum* to the man who has no access to a medical library.

At page 368 is the only error in proof-reading observed. The illustration of radical amputation of the breast shows the insertion of the pectoralis major being severed. The legend states that this is the sternomastoid. Two of the contributors have slipped into the ancient error of writing "morphia" for morphine. The others have accepted the direction of the Commission on Pharmacopœia of the General Medical Council that the names of *all* alkaloids end in "ine". The drawing of the "crooked heel' boot for flat foot does not agree with the text. These are the minor faults in a book that is beautifully produced by the publishers and filled with accurate information.

Regional Analgesia for Intra-abdominal Surgery. N. R. James. 57 pp., illust. 6s. Churchill, London, England, 1943.

In preliminary narcosis and in type of infiltration drug used, the methods described by James differ from those used by any previous author. His advocacy of the intravenous use of omnopon or morphine in fairly large doses will, by some, be considered radical, but it is certainly effective and the author does stress the danger, the necessary precautions, and the treatment of overdosage.

Instead of using dilutions of procaine hydrochloride (novocaine), the author describes the preparation and use of solutions of amethocaine hydrochloride, produced unfortunately under another of the rapidly growing profusion of confusing trade names, namely anethaine, already known as decicaine or pontocaine. This drug, as used by the author, gives up to three hours' analgesia and relaxation. The anatomical data for placing properly the various injections are most complete, even making it appear easy to carry out posterior splanchnic blocks. Special chapters are devoted to modifications in technique for various abdominal operations.

Undoubtedly the time consumed in producing analgesia by the methods described is considerable but James very ably outlines the many advantages to be gained, not only in poor risk patients but also in the good risks where relaxation by inhalation anæsthesia is difficult. In this he stresses the necessity of co-operation between the surgeon and the anæsthetist to obtain the best results.

The author has advanced remarkably in his studies of regional analgesia since he first became interested in the subject three years ago at the Radcliffe Infirmary, Oxford, and his small, but well-illustrated, book is a very welcome and useful text for anæsthetists who desire to keep their knowledge up to date.

Abdominal and Genito-urinary Injuries. Military Surgical Manuals, No. 3, prepared by the National Research Council (U.S.A.). 274 pp., illust. $3.50. Saunders, Philadelphia; McAinsh, Toronto, 1942.

This is one of a series of six military surgical manuals. Its purpose is to bring specific knowledge on abdominal and genito-urinary injuries to the general surgeon, the gynæcologist, the orthopædic surgeon, who find themselves faced for the first time with the surgical problems of modern war. Military in tone, the book is specific, concise, and deals entirely with diagnosis and treatment. Illustrations are adequate and each chapter is supplemented with many references.

A surgical work produced under the auspices of a committee containing such names as Evarts A. Graham, Irvin Abell, Donald C. Balfour, Alton Ochsner and I. S. Radvin, must be essentially sound. The section on Genito-urinary Injuries, edited by the Sub-committee on Urology of the Committee on Surgery, with Herman L. Kretschmer as chairman, is equally good. But no book, prepared to order by a committee, is likely to present the profound, closely knit structure of the monograph. The types of weapons and the wounds they produce, the assessment of probable damage by the study of wounds of entrance and exit, are well presented. The treatment of shock, and preoperative care are dealt with very briefly, perhaps because they appear in another volume of the series. Present methods of using the sulfonamides and penicillin would appear to have developed since this section of the book was written.

On the whole, the book should prove of great value to those for whom it was prepared, while the general surgeon will find much of interest and use on its pages.

Diseases of the Breast. G. F. Geschickter. 829 pp., illust. $12.50. Lippincott, Montreal, 1943.

The appearance of this book has been awaited with interest by pathologists and surgeons. It is welcomed as a most timely addition to the literature on the subject. The author's purpose is to bring together the results of special studies by workers in surgery, radiology, obstetrics and gynæcology, pathology, endocrinology and laboratory technology. To this end a large volume of original material has been analyzed. This includes the collection of Bloodgood and the follow-up studies recorded in the Surgical Pathological Laboratory of Johns Hopkins and the results of years of experimental study by the author himself, especially on the endocrinology of disease of the breast.

There is no attempt to prove any hypothesis in this book. Controversial subjects are not discussed by a partisan. The results of examination of definite material is shown and the reader left to draw his own conclusions.

The section on treatment is adequate and criteria of operability of cancer and the use of radium and x-ray therapy as primary or auxilliary treatment are clearly stated. Endocrine treatment of adenosis is well reasoned and set forth logically. The emphasis is, as might be expected, on pathology and diagnosis but there is no loss of balance. Chapters on diseases of the male breast and on experimental work in inducing most of the diseases of the mammary gland in animals, greatly add to the interest of the book.